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Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

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RICHMOND, VA., OCTOBER, 1923

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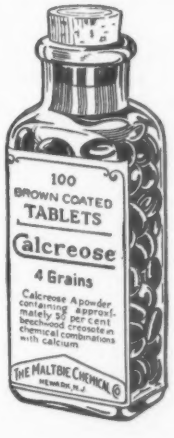

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Fifty-fourth Annual Session, Roanoke, Va., October 16-19, 1923.

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Original Communications

BILATERAL NEPHROLITHIASIS.

By ROBERT C. BRYAN, M. D., F. A. C. S., Richmond, Va.

Unilateral stone is far more common than bilateral, the right kidney more often affected than the left. It is well known that Jews are more liable to stone in the kidney than any other race, and the reports of the Johns Hopkins Hospital show there has never been a stone in the kidney of the negro.

The determining factor for the immediate production of stone is the formation of a nucleus, whether it be bacteria, blood clots, shreds of tissue, colloidal matter, parasites, such as schistosoma hematobium or filaria sanguinis hominis. Infection apparently does favor stone formation, but the character of the germ must be taken into consideration, for pyelitis is much more common in the female, eight to one; and stone more common in the male; the colon bacillus, the more frequent cause of pyelitis, is never found in stone. It has likewise been suggested by Rovsing that certain foods that contain alkaline waters predispose to phosphaturia and that certain acids such as grapes and tomatoes produce oxaluria. Rosenbach has produced stones in rabbits and dogs by feeding them oxamid. Cutting off the nerve supply and putting foreign bodies in the kidney immediately start stone production. The most frequent age for stone in the kidney seems to be between twenty and thirty, and each decade following shows a gradual diminution in the predisposition to stone formation.

It is of interesting clinical significance that stone does not occur more frequently on both sides simultaneously. These obscure etiological factors that bring about crystallization should oftener be bilateral. We not infrequently see recurrence of stone on the same side within a few months of a previous operation, the other side escaping this cyclic production. Recently we removed from the left side a stone in the ureter and two months later a large stone from its corresponding pelvis, which had not shown formerly by X-ray examination. And the question of stone escaping X-ray examination is ever with us, throwing no shadow, which it could not do by virtue of its chemical consistency.

Braasch consummated the question of stone formation recently, at a meeting of the Southern Medical Association in Chattanooga, when he stated:

"In the study of the etiology of urinary concrements, we deal with an abnormal type of crystalline precipitation. To ascertain what mechanism is at fault in causing the atypical deposition and fusion of these crystals into a stony concrement is the problem that has confronted us for some time. The power of the urine in health to hold the constituents of calculi in solution, or to bring about their deposition as isolated entities, is due to the presence of finely divided particles of organic matter, the so-called *protective colloids*. Experiments have suggested that stone formation might be due to one of several factors: (1) the excretion of an excessive quantity of crystalline material beyond the power of the urinary colloids to maintain either in solution or deposition of isolated noncoalescent crystals; (2) a deficient amount of protective colloid in the urine; or (3) the precipitation of normal colloids or masking of their protective activity by bacterial exudates or by foreign colloidal matter excreted as the result of an abnormal metabolism. It has been demonstrated that colloidal matter going beyond the limit of that capable of being handled by the urinary colloidal machinery fusion of crystals occurs and calculus formation took place.

"Experimental production of an excessive excretion of calcium oxalate in the urine over a prolonged period of time would result in the aseptic formation of calcium oxalate calculi. Furthermore, it was shown that the mechanism of such calculus production was related to a change in the morphology of stone-forming crystals from a non-fusing to a fusing or coalescent type. The physico-chemical influence of colloidal matter on crystalline morphology may theoretically, at least, be applied. We may assume that, by enormously increasing the quantity of the crystalloidal calcium oxalate in the urine, we overwhelmed the protective colloids of the urine which were present only in amounts sufficient to maintain the solution or crystalline isolation of the quantity of calcium oxalate normally present. When the quantity of oxalate excreted passed the limit of that capable of being handled by the urinary colloidal machinery, then fusion of crystals and calculus formation took place.

"The second phase of our experimental problem, namely, to produce a deficiency in the quantity or

quality of protective colloid in the urine of animals, has thus far been baffling. However, Lichtwitz has demonstrated that the removal of colloidal matter from urine in vitro, either by extraction with ether or benzine, or by dialysis, uniformly results in a precipitation of phosphates or of calcium oxalate. Furthermore, Schade, of Kiel, in 1909, produced stony masses in vitro by clotting fibrinogen in the presence of freshly precipitated phosphates, oxalates and carbonates, thus giving tremendous impetus to the significance of colloidal factors in stone formation.

"Studies tending to show that bacterial exudates may cause an interference with normal urinary colloids in a manner to bring about an atypical precipitation of the urinary crystals and consequent stone formation have been even more fruitful. Rosenow and Meisser, working with streptococci from the urine of patients with multiple recurrent calculi, have repeatedly produced calculi in the kidneys of dogs by the method of specific bacteriology. These streptococci were implanted in devitalized teeth of dogs, which developed urinary calculi consistently after an interval of several months. Such experiments can best be explained by assuming that the bacteria have a specific elective activity on the renal tubules, thus producing a low grade inflammation. The exudate from this inflammatory reaction pours out abnormal colloidal matter into the urinary stream. This we may assume so interferes with the normal colloidal balance of the urine that its solvent power no longer obtains, that deposition of fusing crystals takes place and stone formation occurs."

It is interesting to note the prevalence of stone in the right kidney. Is it due to the anatomical association of the renal pelvis on this side with the colon, a transmural bacillary infection being encourged? Or, is it simply the expression of a congested kidney, slowing of the blood current, stagnation and crystallization from the preternatural mobility of the right side added to the exciting causes as brought out by Braasch?

It is not the intention of the writer to take up the pathology of the kidney in its response to this foreign body, for pyelitis, pyelonephritis, pyonephrosis are progressively in order, the decision to be made is the state of the kidneys, their relative standards to recognized tests, and the probability of a favorable outcome. That kidney showing by chemical and laboratory examinations the highest index is the first to be operated on, and after a reasonable length of time the other organ may be attacked. The value of repeated indigo-carmine, phthalein and thorough urinary examinations, supplemented by complete blood retention tests is evident; in one of our cases this was done five times.

The writer has had the opportunity to notice bilateral lithiasis in several instances and would call attention in one case to that of twins, men, age thirty, who developed and were operated on within a month of each other for stone in the kidney, both on the left side, there having never been any evidence of stone previously, nor has there been since the operation, which was carried out some ten years ago.

The following cases are referred to as instances of bilateral kidney stones:

(1) T. H. M., age forty-one, male, reported to the hospital March 1, 1920. Ten years ago had pain in left side; since December has had pain in both sides; five or six attacks on the right side and three on left; no hematuria. Cystoscopic examination showed the right ureteral os to be small, slightly reddish, and this side could be catheterized for only a distance of two c. m. The left ureteral mouth is found more posteriorly, behind a distinct brim, the catheter on this side is arrested at eight inches, but a free flow of urine emits from this side, one and one-half ounces in about two minutes, which is under considerable pressure. Four c.c. are further aspirated from the catheter. The left kidney is injected with twenty-four c.c. of a twenty per cent solution of sodium bromide and X-ray taken. X-ray examination showed a stone in the pelvis of the right kidney a little larger than a date seed, dilatation of the pelvis of the left kidney, hydronephrosis and hydro-ureter, probably the size of a cigarette: no stone on this side noted. Urinalysis: *right side*, pale watery, nearly clear, sediment scant, acid, no albumin, occasional blood cell, few pus cells, crystals 0, casts 0, epithelial cells few large round and caudate; *left side*, smoky red, very cloudy, sediment heavy red, acid, albumin abundant, blood bulk of sediment, pus few cells, crystals 0, casts 0, epithelial cells occasional large round, mucus no excess. March 5, 1920, under general anesthetic, the usual kidney incision on the right side was made, there was a very short intercostal space, and the patient being quite stout, it was with difficulty that the kidney was reached. It was, however, finally freed from its bed, dislocated downward enough to bring the upper part of the right ureter into the field. A small irregular hard apparently phosphatic stone was densely wedged in the ureter about two inches beyond the pelvic junction. A longitudinal incision was made over the stone and it was removed, the ureter brought together with two sutures of 00 catgut, drain put down to the site of the ureter, tissues brought together with catgut No. two, silkworm gut through skin. Patient made an

uneventful convalescence, leaving the hospital March 25th. Cystoscopic examination having revealed a stricture of the left ureter and X-ray showing a moderate hydronephrosis and hydroureter the size of a cigarette, the patient returned at intervals for dilatation of this stricture. On April 30, 1921, patient returned to hospital complaining of pain in left side so severe he was unable to work. X-ray examination was negative. Cystoscopic examination showed that the old stricture had been dilated so that an olivary bougie went readily to the pelvis of the kidney. This was followed by a No. five French ureteral leaded catheter and there was an immediate flow from this side signifying pelvic distention. The left pelvis was aspirated and 12 c.c. of a heavy flocculent urine withdrawn. Patient was inverted and 9 c.c. of a 1-1000 mercurochrome 220 injected into the pelvis of the kidney and held there four minutes. In view of the history, the repeated outbursts of pain, absence of stone by X-ray examination, the character of the urine, a diagnosis of infected hydronephrosis was made and irrigations of the kidney advised. Urinalysis of the catheterized specimen showed color very pale, nearly clear, sediment scant, faint alkaline, small amount of albumin, occasional blood cell, good many pus cells, crystals 0, casts 0, epithelial cells occasional large round, other sediment few bacilli. Remarks: Stained sediment shows many cocci and bacilli, none acid fast. May 12, 1921, cystoscopic examination showed left os pouting but the crater not unduly red; it is readily catheterized, catheter mounting to pelvis of kidney without apparent pain or embarrassment. Fifteen c.c. of a twenty per cent solution of sodium bromide is injected into the pelvis of the kidney and pyelogram taken which shows a large stone in the pelvis of the left kidney, with kidney much enlarged. The stone apparently was about three-quarters of an inch long. May 17, 1921, under general anesthetic, a left lumbar incision is made, kidney readily reached, but many dense adhesions were found about the upper pole so that it could not be liberated satisfactorily. There were likewise many adhesions anterior and posterior to the hylum of such a dense character we did not dare to break them for fear of rupturing some of the blood vessels. The kidney was very large, varying in consistency, of a dark purplish-blue color, with evidences of an increased intrarenal pressure. Since the kidney could not be brought up in the wound an incision was made along the lower part of its convex border, finger thrust into the pelvis readily detected the stone, which was apparently in the pelvis of the kidney and projecting downward into the ureter. The incision in the kidney liberated from the pelvis quite an amount of pus and debris which had been dammed back by the stone. The stone was removed with forceps and corresponded with the X-ray picture. Kidney was sewn through with wide mattress catgut sutures, drain placed in the upper angle of the kidney bed and brought out through the lower part of the incision. Muscles were approximated with catgut No. two, silkworm gut through the skin. Patient made an uneventful convalescence and has had no further pain or trouble.

(2) Mrs. W. Y. J., age fifty-nine, married, five children. Reported to the hospital July 27, 1921, giving history of intense pain in both sides and throughout abdomen. The present trouble began in May, 1912, with severe pain in both sides, radiating forward and downward across the abdomen and into the pelvis, pain more severe on the left than on the right side. The attack lasted several hours and was followed by a chill and fever. The acute attack lasted only a few hours, but left side has been sore and uncomfortable ever since. Three years previously had similar attack. Patient has difficulty of breathing at times, with feeling of pressure at angle between ribs. Appetite poor since May, digestion good, no jaundice, somewhat constipated, nocturnal polyuria two to three times, never passed any gravel. W. B. C. 10,000. Urinalysis: straw, cloudy, 1,010, faintly acid, trace of albumin, sugar 0, bile 0, indican 0, acetone 0, blood 0, pus abundant, amorphous matter 0, casts 0, epithelial cells moderate number of squamous, irregular and large round, mucus 0, other sediment bacteria. Renal efficiency forty-five per cent. Cystoscopic examination showed considerable debris and floating cloud in bladder medium which required irrigation for a clear field. Mucosa normal, nothing abnormal is seen, no trabeculae. The left ureteral os is readily catheterized No. five French catheter mounting to the pelvis of the kidney without pain, spasm or trauma and there is an immediate flow of heavy cloudy urine which fills a 20 c.c. test tube in four minutes. The right os is likewise apparently normal, but a No. five French catheter mounts only 20 cm. when it is arrested and will go no further. There is no flow from this

side and when irrigated there is no return flow other than that put in. Patient taken to X-ray room and 4½ c.c. of a twenty per cent solution of sodium bromide injected on the right side and 6 c.c. on the left side and pyelogram taken. It is predicted that there will be no result from the right side as the fluid is noted to return along side of the catheter. One c.c. of phenolsulphonephthalein is injected in the vein of the left hand and appears in the urine in three minutes on the left side and, since there is no flow from the right side, catheter is not kept in two hours as it is believed the former test showing forty-five per cent represents only the left kidney. X-ray of right side shows a very small kidney with a shadow in the upper portion. The left kidney is normal in size and shows two fairly large stones occupying probably the two lower calyces. July 30, 1921, under general anesthetic, the left kidney incision was made. No attempt was made to deliver the kidney into the wound, but its pedicle was more or less satisfactorily squeezed by the left hand and incision made along the convex border into the lower part of the pelvis. A branching stone filling the lower calyx was felt, but attempt to remove it with forceps was unsuccessful. It was necessary to break through a rather dense cicatricial band constraining this lower calculus before it could be removed. Since we were unable to find the round symmetrical stone shown by the X-ray in the upper part of the pelvis, we were inclined to believe this was a dense fibrosis of the pelvis throwing a shadow. A rubber tube was placed in the lower part of the kidney bed, and through and through mattress sutures of catgut No. two put through the substance of the kidney, three in number, the free edges of the incision being brought together with catgut No. two silkworm gut through skin. August 1, 1921, about seven p. m., patient died apparently from shock, having never reacted thoroughly.

(3) Mrs. W. C. H., w., age fifty-three. Reported to the hospital October 25, 1922, complaining of pain in right groin, also pain in left side extending from the left kidney into the left iliac region. Twenty-three years ago passed a stone the size of a hazel nut and fifty bird shot stones, followed by frequent attacks of pain so severe as to require morphine. Condition diagnosed as "floating kidney." wore supporter. Three years ago had osteopath and condition became worse. August, 1921, X-rayed and plates showed enlarged left kidney with small stone, right kidney also showed stone not as large as that in left. Operated on December, 1921, large stone removed from the pelvis of left kidney and about a pint of pus evacuated. Left hospital February 3rd, wound still draining; remained home two months; returned to the hospital and a pint of pus was drawn from the left side, drainage tube replaced, which remained in for six months. Wound closed. Physical examination showed well nourished woman, heart normal but for soft presystolic mitral murmur at apex. Lungs negative. Blood pressure 124-84, pulse rate 86. Cystoscopic examination showed bladder capacity normal, mucosa normal, but in the bladder medium heavy tenacious products indicative of a long standing chronic kidney involvement were floating. The left os were small, its crater uninvolved, mucosa normal. This ureteral os was readily catheterized, catheter mounting without any pain or trauma some 20 to 25 cm.; there was no flow, however, from this side although the catheter was irrigated with boric acid solution to assure ourselves there was no blocking of the tube. The right os was swung well to the right, a little difficult to catheterize, its appearance slightly pouting and tightish. This side was likewise catheterized with a No. six French leaded catheter which mounted easily to the pelvis of the kidney and there was an immediate flow of clear amber colored urine which half filled the 10 c.c. test tube in about three minutes. The flow coming abruptly to a stop would indicate that the intrapelvic tension was quite high, expelling its contents under pressure. Two and a half c.c. of a four-tenths per cent indigo-carmine was given into the right median basilic vein at 11:52, appearing at 11:58 along the side of the cystoscope, evidently coming from the bladder. At 12:04 there were evidences of its appearance through the ureteral catheter on the right side. The bladder appearance was taken to be due to a temporary blocking of the ureteral catheter and this test represented the right side exclusively, nothing having been gotten from the left. Patient taken to X-ray and serial X-rays taken. Ten c.c. of a twenty-five per cent solution of sodium bromide injected into the left pelvis and pyelogram taken. Five and a half c.c. of a twenty-five per cent solution of sodium bromide is injected into the right pelvis and pyelogram taken. X-ray showed a large stone in the right kidney and small stone in the left kidney. Urinalysis: pale amber, slight cloud,

sediment scant gray, faint acid, albumin small amount, blood few cells, pus good many cells, crystals 0, amorphous matter debris, casts 0, cylindroids 0, epithelial cells few large round, mucus no excess. Remarks: Stained sediment shows good many clusters of cocci, also of acid fast bacilli. Examination of blood showed W. B. C. 13,600, polys seventy-five per cent, small and large mononuclears twenty-seven per cent, hemoglobin seventy per cent. Renal efficiency November 3, 1922, twenty per cent; November 7, twenty per cent; November 10, thirty per cent; November 19, twenty-five per cent; November 29, twenty per cent. Report on blood showed on November 20, urea 90 mg. per 100 c.c., urea nitrogen 42 mg. per 100 c.c., November 29, 82 mg. urea per 100 c.c. and 38.5 mg. urea nitrogen per 100 c.c.

In consideration of the foregoing the following observations may be stated:

1. Every patient with a stone in one kidney should have both X-rayed as bilateral nephrolithiasis we believe to be more frequent than is supposed.

2. In suspicious cases, indicated by urinalysis and subjective signs, pyelograms with sodium bromide should be used to prove out the presence or absence of stone. This spraying of the stone with a shadow throwing fluid has at times been confirmatory of an opinion which could only be guessed at otherwise.

3. Particular emphasis is laid upon the ingestion of large amounts of water preparatory to operations, or getting the kidney in the "habit of working" so that the strain of operation will be minimized.

4. We believe that the re-formation of stone in a kidney operated upon is caused primarily by the leaving of small particles from the original operation. Irrigation of the pelvis at the time of operation with the double flow catheter would obviate an appreciable per cent of so-called recurrence of stones.

5. In those instances in which the stone has been soft, or examination of it shows some particles or fragmentation have been left behind, we have used a tube put in the pelvis of the kidney for irrigation and drainage for several days. Not only the debris but likewise blood clots which cause much of the pain and distress following the operation are in this way removed.

BLOOD TRANSFUSION, INDICATION AND METHOD.*

By HERBERT C. JONES, M. D., Petersburg, Va.

It is the purpose of this paper to give a brief survey of the development of blood transfusion and to discuss modern conceptions of its uses and methods. It is impossible to say when and where the idea of transfusion first originated, probably the first case on record is that of Pope Innocent VIII, who was operated on in April, 1492. "The vital powers of Innocent VIII rapidly gave way; he had for some time fallen into a kind of somnolence which was sometimes so profound that the whole Court believed him to be dead; all efforts to awaken his exhausted vitality had been resorted to in vain, when a Jew doctor proposed to transfuse the blood of some young person. Accordingly the blood of the decrepit old pontiff was passed into the veins of the youth, whose blood was transferred into those of the old man. The experiment was tried three times at the cost of the lives of the three boys, probably air getting into the vein, but without effect to save that of the Pope." This is the first case in which death is ascribed to air embolism.

It was not until the nineteenth century, following the work of Blundell in England, that transfusion was used with any success. Like every other big achievement in medicine, many failures were made. Medical societies even ostracized men who advocated its use. Most of the early advocates used lamb's blood and cases of leprosy and hydrophobia are recorded as cured.

It remained for Blundell to show how the effects produced by a loss of blood could be remedied by transfusion. Eight ounces of blood was withdrawn from the femoral artery of a dog. Most alarming symptoms developed; shortness of breath, convulsions, and loss of sensibility. After some seconds, six ounces of blood were taken from another dog and injected into the femoral vein with the result that recovery of the dog was complete. He then did a second experiment, allowing the blood to flow from the femoral artery to the femoral vein by means of a tube. This experiment offers the basis for the present day cannula method.

In 1875 Guerrin cut the femoral arteries of two horses and connected the peripheral end of

*Read at the meeting of the Southside Virginia Medical Association in Petersburg, March 1923.

one with the central end of the other, and *vice versa*. This gave a continuity of blood stream and was continued indefinitely until the small horse became plethoric. It was then stopped and both horses made an uneventful recovery.

Landsteiner in 1901 demonstrated the presence of isoagglutins in the blood and divided human beings into three groups according to the kind of agglutin present. A fourth type was added several years later.

G. W. Crile may be called the real pioneer of modern blood transfusion. Around 1900 he perfected a method of anastomosing blood vessels; intima to intima by the employment of a cleverly devised cannula. He put the method into practice experimentally and in clinical research, reporting 225 experimental and 32 clinical transfusions. At first he anastomosed artery to vein and later showed that transfusion could be successfully and more readily accomplished by vein to vein anastomosing. This work stimulated the profession as to the value of transfusion as a therapeutic measure. Many new devices for transferring blood soon appeared. Dr. Crile and his assistants at Lakeside Hospital, Cleveland, Ohio, probably do more transfusions than any other one group of surgeons. They know it to be a safe procedure and their patients are transfused on the slightest indication, both preoperative and postoperative, thus making good surgical risks of questionable cases and shortening their period of convalescence. In late years the method of transfusion at Lakeside Hospital has been changed, a simpler method, which will be described later, being substituted for the arteriovenous anastomosis.

With the development of simpler methods of technique and with the introduction of accurate blood tests, transfusion has lost the danger which once attended its use, until today it is a safe and proved therapeutic measure—rather than a last resort.

Transfused blood increases the bulk of circulating fluid and raises blood-pressure. It provides new oxygen and food for the body tissues. It increases coagulability. It stimulates the blood forming organs and increases the resistance to infection.

Of course the most direct indication of transfusion is hemorrhage, whether it be acute or has been occurring over a long period of time. It is in this group of cases that one sees most marvelous results. A person actually dying from the loss of blood could be saved with a quart of blood, or less, provided the leaking blood vessel is tied and the cause of the hemorrhage removed. A recent case of the writer clearly demonstrated this fact. Mrs. E, 37 years of age, was taken suddenly with violent pains in the lower abdomen. She became pulseless and semiconscious in less than one hour. Six hours later a diagnosis of ruptured ectopic pregnancy was made. She was given salines under the skin and by the bowel, the abdomen was quickly opened and the ruptured tube and blood vessel tied. The patient was then given 900 c.c. of blood, and before she was removed from the operating room she was conscious and her pulse, beating at a rate of 90, was of good volume. She made an uneventful recovery, her temperature never going over 100½ degrees. She was discharged from the hospital on the twelfth day.

Not only in acute hemorrhage is transfusion of value. Many a woman with a bleeding uterus, whether it be from a fibroid, polyp, or a hypertrophic endometritis, will be made a good surgical risk, and her convalescence shortened.

Shock is second only to hemorrhage as an indication for transfusion. The patient who suddenly becomes pulseless and pale during or immediately following a major surgical procedure can be quickly revived with an immediate transfusion. The blood-pressure in these cases is the simplest guide as to whether the transfusion could be performed. A blood pressure of 80 systolic or lower is an indication for transfusion.

Many surgeons today are wisely resorting to transfusion to prepare their patients for major procedures. Especially is this true for cases in a weakened condition whether it be due to an old pus kidney, a bleeding ulcer of the bladder, or a hypertrophied prostate. So today in many of the large hospitals we have a routine typing of the blood on entrance of the patients when a major surgical procedure is in prospect. Thus a telephone call will bring a donor who is suitable and the family is saved the trouble of hurrying here, there, and everywhere to find some one who will gladly give blood. Routine typing should also apply to typhoid cases.

Hemophilia in the newborn babe offers a great field for transfusion. A 10 c.c. Luer syringe full of whole blood injected into the

anterior fontanel in infants, or intramuscularly into the buttocks, will often stop the hemorrhage whether it be from the umbilical cord, mouth, stomach, or bowel. The blood taken from the father seems to act more quickly. The writer has seen only one such case. Hemorrhage from the cord and mouth are successfully controlled by the injection of blood into the anterior fontanel. The infant's blood does not have to be typed until after the second year. Cases of recovery from purpura hemorrhagica are on record following transfusion. However, in many cases it has been used in vain.

The value of transfusion in the blood diseases, namely, pernicious anemia, splenic anemia, leukemia, and hemolytic jaundice, of course, is not as evident as in hemorrhage or shock. In all of the cases the writer has seen there has been an improvement. This improvement is not so marked when the condition resulting from many of the above mentioned blood diseases is grave. A patient with pernicious anemia will often be free from symptoms for several months following the transfusion, only to have a return of symptoms. These cases should be transfused for the comfort which comes to the patient during the interval following the transfusion. Transfusion certainly has no place in acute lymphatic leukemia, being a valuable therapeutic measure only brought into disrepute. However, in myelogenous leukemia and hemolytic jaundice it is of value in prolonging life. It is a matter of record that a case transfused for a blood condition is more liable to have a reaction following the transfusion. This is probably due to the presence of hemolytic agents in the blood.

In septicemia and chronic suppurative conditions, transfusion offers hope in that the patient's resistance is increased by the introduction of healthy red cells and a consequent rise in blood pressure. It is probably wise to transfuse these cases early because a weakened heart muscle results from the toxines present in such conditions and cardiac dilatation may result from the extra work thrown on the weakened heart muscles.

Recently, research work has been carried out in Toronto General Hospital to determine the value of whole blood in the treatment of extensive burns. It is found that the procedure is of great value, not only in the early treatment of shock but later as a means of combating toxicity. A rapid rise in the total urea nitrogen in the blood in these cases offers an index as to the advisability of transfusion. The writer has seen three cases in which there was a drop in temperature and a general improvement following transfusion performed to combat toxicity following extensive burns.

When to transfuse and when not to transfuse is often a question. In answer to these questions one might say, when in doubt transfuse; as to when not to transfuse, the writer would say, when an increase in the volume of blood might cause disaster to the patient, as evidence of cardiac dilatation or pneumonia.

The minute a question of transfusion arises, a donor should be sought—a healthy young man or woman who will give his or her blood either for friendship or money. As a rule, several members of the family should be typed and from those found to be of the same type as the patient a donor is selected, preferably the most healthy one. The possible donor is then questioned to determine the possibility of syphilis, a Wassermann always being done if the emergency permits, also a complete blood count is usually made and a careful examination of the heart and lungs. Oftentimes the emergency will not allow such a careful examination and then the most available donor is taken.

As to the typing of blood, one might say that it is the most important part and should always be done with care because experience has proved that faulty typing is the cause of most of the misfortunes of transfusion. Requiring about thirty minutes it is a simple procedure in the hands of the trained.

Human blood belongs to one of four types, the type being determined by matching the blood with known serum types; only a drop of blood is required from the patient and donor. The direct method is probably more valuable in determining the amount of reaction a patient will have, but it requires more blood and takes more time to perform.

There are many methods of doing blood transfusion, most of which can be done and give the same results. Some methods are preferred to others because they are simpler and do not require the skill; other methods because they produce less reaction. The direct method is used less today than several years ago, not because it is not a safe and logical procedure,

but because it can only be done right and safely by one skilled in blood vessel surgery. The most universally used method today is the citrate method, or the use of an anticoagulant. It is being used with success, although it has a great drawback because of the number of reactions following the transfusion. These reactions often are most severe; chills and temperature of 105 degrees are alarming and certainly not to be desired. Simpler methods for the introduction of whole blood offer the prospect of less reactions and save the operator no end of embarrassment. Dr. Lewisohn who contributed this method to the profession reports only 20 per cent reactions and chills following many hundreds of transfusions. In the hands of other men the percentage of chills has been much higher. Many other methods in the hands of their respective advocates are safe, and probably the best transfusion to do is the one with which the particular surgeon is most familiar.

The writer will describe a method which in no sense is his own, but a method which is simple and safe and can be used by the average surgeon. It is a method in which the whole blood is transferred, without an anticoagulant, from the vein of the donor to that of the recipient by means of a Vincent tube and a simple cautery pump. The Vincent tube is a paraffine tube, cylindrical in shape, capable of holding 350 c.c. of blood. There are two tips, one at the bottom for the insertion into the vein and the other at the side near the top for the attachment of the cautery pump. With stopper intact, it being held by paraffine, and the tube full of blood with the cautery pump attached, the cylinder becomes airtight and pressure on the bulb will force the blood into the recipient's vein. The patient and donor are placed on operating tables with supports for their arms, the left arm being always used in the case of the donor with the forearms extended; the arms are prepared with iodine and alcohol, the preparation extending about four inches above and below the elbow and the arm and hand covered with the usual sterile towels. One per cent novocain is injected along the median cephalic vein at the elbow for about one and a half inches along its course. After anaesthesia is produced, a longitudinal incision about an inch and a half in length is made through the skin along the course of the vein, the fascia is dissected and the vein exposed about three-quarters of an inch in length. Catgut ligatures are placed around the lower and upper end of the vein. The upper end is tied in the donor and the lower end in the arm of the patient. The untied ligatures act as brakes to control the flow of blood and are tied at the end of the transfusion. An oblique opening in each vein is made with fine scissors, the lumen of the veins being exposed by the application of small mosquito forceps into the walls of the vein. This is done so that the tip of the tube can be inserted into the vein. With the upper end of the vein tied in the arm of the donor and the lower end being held by an assistant by means of the untied ligature, the tip of the tube is inserted into the vein towards the periphery and the tourniquet applied. The tube is gradually filled in from two to four minutes by means of the tourniquet and the squeezing of the hand. When the tube is filled, the cautery bulb is attached and the tube withdrawn, an assistant controlling the bleeding by pulling up on the untied ligature around the lower end of vein. The blood will not run out of the tube because pressure is made on the bulb, the tube then becoming airtight. The tip of the tube is then inserted into the vein of the patient towards the heart and by pressing on the pump, the blood will rush slowly into the vein of the patient. The tube is removed while two or three c.c. of blood still remain to prevent the possibility of air embolized. The assistant pulls up on the upper end of the vein by means of the untied ligature to prevent bleeding back. As a rule three tubes, each containing 300 c.c. of blood, are given, depending upon the condition of the patient and donor. The untied ends of the veins are then tied with the catgut ligatures which have been used as brakes and the wounds closed with clips. The whole procedure can be performed in from thirty to forty minutes. The Vincent tubes are cleaned in boiling sodium salicylate and are then run through the autoclave, dried, and coated with liquid paraffine, the stopper inserted and the paraffine allowed to harden. They are then put up in sterile towels and are ready for use again. The blood will not clot in these tubes in from ten to twelve minutes.

The writer believes this to be a simple method of transfusing whole blood. He has used it on twenty-six occasions and probably has assisted in using it on fifty other occasions.

Very few reactions have been noted and these reactions were not severe, there being an average rise in temperature of about two degrees.

Transfusion should always be performed with the most rigid asepsis and, performed in this manner, is a most valuable therapeutic measure. Wisely employed transfusion will often prove a life-saving resource; unwisely used it will surely become discredited.

THE SCIENCE OF REFRACTION.*

By EMORY HILL, M. D., Richmond, Va.

Refraction, like medical practice in general, is both a science and an art. The effectiveness of the art is in direct ratio to the understanding of the science. There is a vast difference between the haphazard results of a practice based on the individual's experience in doing many times what he has never learned to do accurately, and the uniformly good results of making what is a mathematically exact measurement based on well established principles of physiologic optics. General medicine may be practiced by the application of treatment found to satisfy many patients after looking at the tongue, feeling the pulse, and boiling the urine in a test tube to see if it becomes cloudy; but the modern internist is a safer advisor because his treatment is based upon more exact knowledge of the patient's physical derangements. This contrast is no greater than that between the refraction often done and the refraction which may be done if we seriously undertake it. Refraction as an applied science, rather than merely an art, is my subject. This means substantially the use of objective tests of refraction as a foundation for subjective tests, and this, in turn, resolves itself largely into a question of cycloplegia.

If the curriculum of the medical schools were not already overcrowded, it would be worth the student's time to take a course in medical history. A perspective of the progress of science would teach him to avoid some mistakes of his predecessors, and to cling tenaciously to some of the achievements of past generations. The latter might well be the result of a review of the history of refraction in America. One of the epoch-making events in American medicine was the announcement by Weir Mitchell in 1879 that certain headaches are due to the nervous strain entailed by the use of defective eyes and that such headaches can be relieved by the exact correction with lenses of the errors of refraction of such eyes. At Mitchell's instigation the science of refraction was put into practical use by Philadelphia ophthalmologists, with the aid of atropin used sufficiently to produce complete and prolonged cycloplegia. It is to be observed that this achievement was not the result of somebody's individually discovered pet method of manipulating lenses, not by "fogging" the vision, not by sitting the patient before a formidable looking instrument called the ophthalmometer and reading off a formula, not by any of the methods taught in a school of optometry; but by the application of perfectly well-known laws of physiologic optics, laid down by Donders in 1864 in his classic work which is not a popular book on the shelves of the present-day specialist. Good refraction was done in other places and can be done today without slavishly following every detail of the Philadelphia method of 40 years ago; but we shall always owe a large debt of gratitude to the men who showed us how to make refraction work about the most mathematically exact thing in the domain of medical science.

A further development in American medicine occurred, perhaps inevitably but to the detriment of ophthalmology, when the era of specialism arrived. It may be doubted whether a practice confined to so narrow a specialty as ophthalmology was possible outside the large cities, or whether the postgraduate facilities available could have supplied the needed specialists for a rapidly growing population. In any event, the desire to enter special practice, and the rewards of such specialization as compared to the modest income of the general doctor, led to an urgent demand for postgraduate instruction, which was supplied by brief courses in eye, ear, nose and throat hospitals and clinics in the medical centres. Quantity production seems to have been the ideal, and the result was the hasty acquisition of rule of thumb methods of doing a routine office practice and the simpler surgical procedures, together with a kind of refraction which has little to commend it over the optician's practice. The situation appears to have grown worse instead of better in the past few years. With the war, graduate study in Europe was abandoned and the staffs of the better ophthalmic clinics in America were depleted. Following the war, a general discontent with medical practice in rural communities and family practice in the smaller towns

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has developed. Today we find the ranks of our specialty increasing at a surprising rate. It would seem that eye, ear, nose and throat work has a fascination exceeding that of any other branch of medicine. We see very few men going into the specialty through the need for such work in their own communities and their recognized obligation to meet this need by gradually acquiring special knowledge; we see very few men undergoing a rigid training of two, three or four years in the medical centres. On the contrary, we see many men leaving a good general practice to take a few weeks or months of postgraduate study, which is at best a kindergarten course, and settling in a somewhat larger community as full-fledged specialists. I am not competent to pass on the character of their work in oto-laryngology, but I venture the opinion that they are exceptionally gifted individuals who can learn to do uniformly good refraction in less than a year of constant practice at the side of an expert; and I am at a loss to know how they ever acquire the necessary experience in a busy routine of isolated practice three-fourths of which bears no relation to ophthalmology.

The failure of the rank and file of ophthalmologists to perform their duty as refractionists is shown in the very general confusion of the layman's mind as to the meaning of the words oculist and optician; we may well ask ourselves if there is a difference as clear-cut as we ought to have made it. The prominence of the so-called optometrist, who is called "Doctor" by his clientele, is embarrassing to us, and I know of no way to lessen the embarrassment except to look our faults in the face and see wherein we have failed to live up to the obligation which was met by our predecessors who took seriously the subject of physiologic optics, used cycloplegics with thoroughness, and devoted sufficient time to refraction to ensure exactness. If oto-laryngology is our chief interest, and ophthalmology a side issue, we shall not do good refraction. If surgery is our main concern, we shall not find the tedious routine of refraction work agreeable and it will be neglected. I am well aware that ophthalmology and oto-laryngology can be practiced together with faithful zeal and skill; too many members of this society are living proofs of this possibility to let us doubt the fact; but I do deplore the evident and acknowledged lack of interest in refraction among some of our numbers who do it at all only because it is the conventional thing.

The results of the most painstaking refraction work, as taught by the late Wm. Thomson and S. D. Risley of Philadelphia, by Duane of New York, Jackson of Denver, and others among the masters in ophthalmology, are satisfactory to largely over 90 per cent of our patients. I doubt whether the many short cuts in use in our offices today can show anything even remotely approximating this. Guesses may give 50 per cent of successes, and long experience in guessing may add to the percentage; but guessing is not warranted where certainty is possible, and certainty is possible in nearly all cases. That we cannot obtain 100 per cent of successes is due to some conditions beyond our control and others which we may control if we will. We can refuse to undertake a refraction for a patient who wants to catch the next train. We can demand two days as a minimum for the patient who does not require a cycloplegic, but merely a mydriatic, three days for the patient who requires a cycloplegic. We can elicit a history which shows that the eyes are not alone at fault and insist upon other study of the case to arrive at the cause of the symptoms. We need more intimate co-operation with the family doctor. Eyes are not isolated organs and the ophthalmologist ought not to be an isolated practitioner. We are at a disadvantage when the patient lives at a distance and cannot return for further observation. We are helpless when confronted by the patient who will not acknowledge his difficulties and inadequacies for his business and domestic life, and insists that a pair of glasses shall cure a mind diseased and restore domestic felicity. Eye troubles are sometimes defense reactions and require a psychiatrist instead of an ophthalmologist. Then there are patients who absolutely refuse to consider a refraction as anything more important than buying a new roll of films for a kodak. There remain, however, the very great majority of our clientele who want scientific refraction and will take the time for it. What is their due? With exceptions always to any rule, a routine of thoroughness can be outlined which I venture to state as follows:

Children should be refracted with atropine. Their eyes, if they need any attention, are worth more than two weeks of schooling. Atropine sulphate in 1 per cent solution, used three times daily for a minimum of 3 days.

is necessary for complete cycloplegia. This may be insufficient. It is easy to demonstrate the fact that accommodation still exists, and to continue the atropine one or two days longer. No marked discrepancy should exist between retinoscopic and subjective findings. It is sometimes necessary to prescribe lenses on the basis of retinoscopy alone, and one's retinoscopy should be dependable except in those cases where distorted or clouded media interfere. This thorough routine is especially urgent in squint cases, where a full correction is necessary to abolish that excess of accommodation which brings on excessive convergence.

Young adults may need atropine as much as children. This can be determined by testing the remaining accommodation after homatropin has been used. The history and symptoms of the individual case may point to the need of rest to an overtaxed ciliary muscle. The therapeutic effect of atropine upon the entire uveal tract should not be forgotten. Mydriasis and temporary cycloplegia are by no means the total effect of drugs used for the measurement of refraction. The majority of adults can be refracted satisfactorily with homatropin. A 2 per cent solution used, a drop at a time, until 6 drops have been instilled in the course of 30 or 40 minutes gives sufficient cycloplegia in 1 to 1½ hours in most cases. Any marked disagreement between retinoscopic and subjective findings suggests remaining accommodation and calls for more cycloplegia. Repetition of the drops on a second day, or the use of homatropin three times daily followed by intensive use in the office may be necessary in these cases. Post-cycloplegic tests are of greater value in adults than in children, because fixed habits of ciliary muscle strain interfere with the comfortable use of a full or nearly full correction. This applies to the hyperopic correction only. Of course the cylindric glass is kept at the strength found under cycloplegia. The optician's argument that cycloplegia is useless if the prescription for glasses is not identical with the findings under cycloplegia is based upon gross ignorance and needs no refutation. Post-cycloplegic tests are of greatest use in persons who are presbyopic.

Myopes are perhaps the most neglected people whom we refract. Young myopes accommodate, because that is the natural and inevitable thing for any eye to do even if the result is futile; and they accommodate because they usually have an astigmatism which they are trying to overcome. Therefore, myopes need cycloplegia for refraction, and the disastrous results of unchecked myopia justify as thorough use of cycloplegics as does hyperopia. The ease with which myopes can get improved distant vision with lenses is really a misfortune. If it were not so easy to sharpen their vision, they would not be so carelessly treated. Increasing visual acuity is not the only aim of the refractionist; indeed, it may be a calamity if it is secured at the expense of a ciliary spasm.

Cycloplegics are as necessary in people 40 years of age as in younger people, and often more necessary. Duane has called attention to ciliary spasm at this age and beyond. This type of case requires individual study; no hard and fast rule can be laid down. To cease using cycloplegics at 40 years, or 45 or 50 years, is an utterly irrational thing. In general, the older the patient the less cycloplegic is necessary; but this rule has so many exceptions that it cannot be followed. It is taken for granted that the usual observations to exclude glaucoma have been made. The bugbear of glaucoma raised by the incompetents in and out of the profession need not frighten us.

There is no eye in which a small pupil allows the careful study of the eye ground which should be a part of every refraction and the satisfactory retinoscopy which also should be part of every refraction. When cycloplegia is unnecessary, mydriasis is of great value. This need not be extreme mydriasis, but the pupil should not contract sharply when light is thrown into the eye. Old people have small pupils and frequently sclerosed lenses; therefore, they particularly need a mydriatic for refraction. One or two drops of a 2 per cent solution of euphthalmine or eucatropine enables the observer to study such eyes and does no possible harm. The practice of doing manifest refractions without study of the eye grounds in old persons precludes accuracy in fitting glasses and also the discovery of valuable diagnostic signs of local and general disease. Such scant respect for the eyes of the old is responsibile for some of the blindness from chronic glaucoma which occurs while the unfortunate victim is waiting for an imaginary cataract to ripen.

In short, refraction is a matter of scientific accuracy if we choose to make it so. Experience increases the percentage of satisfactory

results from the practice of an art; but without a thorough grounding in the underlying science no uniformly good results will follow. If we cannot demonstrate from our case histories over 90 per cent of satisfied patients whom we have refracted, something is wrong with our methods. The largest single factor in good refraction is cycloplegia; other important factors will be considered by the speakers who follow.

DIAGNOSTIC METHODS IN REFRACTION WORK.*

By HUNTER H. McGUIRE, M. D., Winchester, Va.

To attempt to discuss the many and varied problems of refraction work before a body of men whose daily activities are largely concerned with all phases of this branch of our specialty would be an undertaking which would involve, not only an immense amount of labor, but would be a repetition of facts which have been brought out in the mass of literature which has been devoted to this subject.

It occurs to me, therefore, that it would be more profitable for those of us, to whom has been assigned the task of leading the discussion in this symposium, to give our individual views on those methods of examination which have proved to be the most efficient in our experience and to point out, if possible, the relative value of the various methods which have been advocated.

Inasmuch as the large majority of patients who come to us for the relief of ocular troubles are victims of eyestrain resulting from errors of refraction or muscular anomalies and, inasmuch, as our success in ophthalmology is largely dependent upon our ability as refractionists, it is evident that the importance of the subject cannot be overestimated and that nothing should be left undone to make perfect our technic in estimating the error and to give us an unerring judgment in correcting it.

At the outset and before taking up in detail some of the diagnostic methods which have proven useful to me in handling such cases, I wish to emphasize one phase of the subject, upon which I have always felt that insufficient stress has been laid in text books and in journal articles. I refer to the importance of systematic history taking and to the necessity for obtaining from the patient such facts as have a direct bearing upon the treatment of his case. Study the patient, his occupation, his environment, his habits, the position he assumes in reading and at his desk, his facial expression, his carriage, and his mental make-up. Give him time to tell you in his own language how he suffers, and obtain from him, by direct questions, the symptoms which need correction.

Bear in mind that the presbyopic bank clerk who is constantly shifting his position and thereby altering the distance in his near work, though he may show the same amount of presbyopia, will necessarily require a very different correction from the man of letters who pores over books in a fixed position, in an easy chair, and who, because of his culture, expends a greater amount of nervous energy in his work.

The high-strung neurasthenic type whose symptoms are always exaggerated and who seeks your advice for the relief of manifestations which are either real or imaginary, must be approached in a far different manner than would be necessary in the man of health and vigor, whose mental poise is well established, and who is essentially a more normal individual. The estimation of the error and its correction in the case of the former will necessarily involve a greater degree of accuracy and a more careful attention to detail than would be regarded as essential in the case of the latter.

The seamstress, bending over her task from early morn to late at night, more often than otherwise, in badly lighted and ill ventilated rooms, though she may show the same type and amount of error as her more fortunate sister, who lives under ideal conditions with her eye-work limited to a perusal of the social column in the daily press and a study of the latest fashion charts, will of necessity, require greater assistance to her overworked ciliary muscles and more intelligent advice regarding the proper care of her eyes.

It is with the aid of these few crude examples and the enunciation of certain, which may seem to be very elementary, principles, that I am seeking to drive home a principle which I believe is frequently overlooked in our very busy lives and the observance of which I regard as very necessary if we are to become successful refractionists. And it is simply this: In undertaking the treatment of any refraction case, study the individual as well as his eye. The adoption of such a policy will not only serve to give us the best results in the

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treatment of these cases but will eradicate from the public mind a misconception, which I sometimes fear has become deep rooted, with regard to the nature of our work and the association of ocular disturbances with general systemic involvement.

The methods we adopt in the examination and treatment of refraction errors should of themselves convince the public that the eye is not merely an optical instrument standing apart and exercising an independent function of its own, but that it is an important part of the human economy with errors and diseases closely associated with other organs of the body and that physicians who have devoted their life's work to the study of its abnormalities are alone capable of correcting them.

The comprehensive study of a refraction case, as is well evident to all of you, involves an immense amount of painstaking labor and many methods have been suggested for determining the type of error and its amount. I shall only discuss, as briefly as possible, those diagnostic measures which, in my daily routine, have impressed me with their value and which have enabled me to solve difficult problems with comparatively little labor and without sacrificing accuracy.

For purposes of description these methods may be divided into objective and subjective determinations. Before taking up in detail the various means of diagnosis, I wish to go on record as saying that it is my firm conviction that the correct interpretation of a refraction error, except in the case of illiterates and young children, can only be made by the use of both objective and subjective methods. I do not believe that one can be depended upon to the exclusion of the other. The true state of the refraction can only be determined by a judicious use of both methods.

With regard to objective determinations I shall limit my remarks to the ophthalmoscope, the ophthalmometer and the retinoscope.

It may seem superfluous to even mention to a body of ophthalmologists the importance of a complete ophthalmoscopic examination in patients who come to us for glasses, and yet all of us know of men of ability who are perfectly capable of interpreting fundus pictures, who seem quite willing to complete their investigations and prescribe for the patient without knowing the condition of the eyeground and the state of the refractive media. If satisfactory central vision is obtained from subjective tests, they seem quite willing to assume that the entire fundus is healthy and the patient is sent on his way rejoicing in the fact that his new glasses are giving him wonderfully acute vision when, not infrequently, an insidious pathologic process is developing in the periphery of his eyeground. In most instances this omission on the part of the oculist is due either to the necessity for saving time both to himself or his patient or to the knowledge that a large majority of refraction errors are unassociated with ocular lesions. It seems to me, therefore, and I have adopted this practice in my daily routine, that the ophthalmoscopic investigation should be the first method of diagnosis to be employed in the study of the refraction error. By means of it we are enabled to determine very quickly whether we are dealing with a diseased or a healthy eye, the type of error can be determined, and its amount can be approximately estimated. With this information in hand, the subsequent procedures can be utilized with a greater degree of satisfaction and accuracy than would otherwise have been obtained. No refraction case should be discharged until a complete ophthalmoscopic examination, if necessary under a mydriatic, shall have been made.

We are all perfectly familiar with the limitations of the ophthalmometer, in that its records are only concerned with the anterior surface of the cornea. Keeping this fact in mind, however, I regard it as a valuable aid in the diagnosis of most astigmatic errors. In high degrees of error, particularly in post-operative astigmatism, it will usually give reliable information as to the axis and approximate strength of the cylinder to be prescribed. In small degrees of astigmatism, with the rule, its readings are not always verified in the subjective tests. This, of course, can be explained by the fact that lenticular astigmatism will frequently be associated with the corneal defect. In astigmatism against the rule, it usually will, in my opinion, give fairly accurate readings. Irregular astigmatism is very quickly recognized by the use of this instrument and by reason of this fact the subjective examination in these cases is made less tedious both to doctor and patient. As an axiomatic fact it may be stated that the ophthalmometric readings, while valuable as aids to diagnosis, should never be adopted in the final prescription for lenses unless they agree with the retinoscopic findings and the subjective tests.

Ophthalmology owes a debt of gratitude to Jackson and Thorington for elaborating and perfecting the technic of retinoscopy. In my opinion, it is by far the most reliable of all the subjective methods for determining the character and amount of the refraction error. While to the beginner it may seem to be a difficult method to master, most observers will agree that if its details are carried out with the precision and care which have been advocated by experts in this means of diagnosis the results will be most gratifying. Constant practice on the various forms of schematic eyes is certainly a valuable method for developing a high degree of efficiency in the performance of this test. In children and illiterates it is, obviously, the one method upon which we can place the greatest reliance, and in these cases, it is my belief that it can be depended upon to the exclusion of all others. While some observers are of the opinion that satisfactory results may be obtained from the retinoscope without resorting to complete cycloplegia, my experience has convinced me that accuracy in this method of diagnosis is dependent upon full relaxation of the accommodation. In executing the test, I have found in my own case, that working at a distance of one meter with a plane mirror and adding or subtracting one diopter, as the type of error indicates, has given me the most satisfactory results, though I realize that this is largely a matter of personal preference.

In the subjective determination of the refractive error and the estimation of the various types of heterophoria, the intelligence of the patient is a potential factor in enabling us to make logical deductions from the findings. Given, however, a fair degree of intelligence on the part of the patient and a non-irritable state of mind on the part of the examiner, the working out of the refractive state resolves itself into a very interesting problem. Even in patients who are mentally alert, I believe it is well, in some instances, before beginning the subjective examination, to explain very carefully that it is not their mental faculties we are investigating but their visual powers and that the latter will be more accurately determined if the imagination is not brought into play, and if for the moment they can forget they have a mind.

I believe that most ophthalmologists are of the opinion that in the diagnosis of the refractive error by the subjective method the results obtained from the use of the trial lenses and test cards are to be regarded as final and that in the ultimate solution of the problem this procedure may be looked upon as the court of last resort. While in the main I fully concur in this opinion. I think there are certain conditions which materially influence the findings by this method and which, not infrequently, may lead to inaccurate conclusions. Fatigue of the ciliary muscle from too prolonged efforts to bring out the manifest error is certainly one factor to be reckoned with and will often bring about misleading results. It is far better, in my judgment, to make the patient return for frequent short examinations than to persist for a long period in the attempt to measure his error when his muscles are fagged.

Improper or inadequate illumination of test cards is another condition which interferes with accurate results in the subjective tests. The plan suggested a few years ago by a Committee of the American Ophthalmological Society, or some of its modifications, is admirably adapted to office requirements. Reflected light of daylight intensity and evenly distributed over the test object makes an ideal illumination and is far superior, in my opinion, to some of the more elaborate designs in which the source of light is placed behind the test object and the rays directed through some translucent material.

The advantage of conducting the examination amid quiet surroundings must be apparent to all of us. I do not know of anything more disconcerting to the patient or more annoying to the examiner than the presence of solicitous friends or relatives in the refracting room who either persist in prompting the patient or from idle curiosity make a complete investigation of the office equipment and all the while make audible comments when you are endeavoring to secure the intelligent co-operation of the patient. These then are some of the factors which materially influence the findings in the subjective examination and should, if possible, be eliminated if our patients are to secure the best results from our efforts.

The method of procedure in the use of the trial lenses is so familiar to all of you that it hardly seems necessary to go into details with regard to their use. There are, however, certain refinements in trial case accessories and in the construction of trial frames which, in my opinion, have been of great practical value in

diagnosing the refraction error by the subjective method.

In bringing out small degrees of astigmatism and in locating the axis of the cylinder with precision, the cross cylinder is a quick and efficient agent and enables the examiner to employ plus and minus cylinders in the further steps of the examination with a greater degree of confidence in his judgment. It is likewise particularly useful in checking up the final correction to ascertain if the strength of the sphere or cylinder should be altered. This little device which was first described by Jackson thirty-five years ago has not received, in the literature, the attention it deserves. In my judgment it is by far the most useful method of estimating astigmatism and accurately locating the axis of the cylinder by the subjective method. A detailed description of its use and value is given by Dr. Crisp of Denver, in the March number of the *American Journal of Ophthalmology* and I would strongly urge that this article be given your careful consideration.

In some cases of astigmatism where it seems difficult to find the principal meridian of greatest and least curvature, the stenopeic slit is a useful agent in bringing out these meridians and, while I do not employ it as a routine method of examination, it certainly is of value in many instances. Recent advances in the construction and adjustments of trial frames have certainly, it seems to me, been of very material aid in enabling the refractionist to obtain better results and to give him the assurance that his findings are more scientifically accurate than was possible with some of the very crude contrivances we were obliged to use in former years. The independent pupillary and vertical adjustments together with improved methods of raising, lowering and tilting the frame and of placing the trial lenses at the correct distance in front of the cornea are all features which have contributed to more exact results. The more elaborate apparatus which in compact form includes batteries of trial lenses, rotary prisms, Maddox rods and other devices for diagnosing the refraction error and bringing out the various forms of heterophoria constitutes, in my opinion, a distinct advance in the examination of the refraction case, but I do not believe it will ever entirely supplant the trial frame and test lenses. It is a convenient and quick method of diagnosis and has the dual advantage of enabling the examiner to make a more rapid change in lenses and of producing less fatigue to the patient. The muscle tests embodied in the instrument, by reason of their fixed position and the ability to absolutely level the apparatus before the patient's eyes, are much more to be depended upon and give more accurate results than do the same tests when used in the usual trial frame. I have used practically all makes of this apparatus and as new models have appeared have added them to my equipment and, while I am convinced that they serve a very useful purpose in the examiantion of the patient, I do not believe that they have yet reached that degree of perfection when it would be safe to discard what might be termed the old fashioned trial case. My usual custom is to examine the patient with this instrument but always check up its findings with the correction in the trial frame and in the final analysis my deductions are based upon the results obtained from the latter. In other words, I feel, as far as the refraction error is concerned, that the trial frame correction more nearly approximates the formula to be given the patient than can be obtained from any other form of instrument.

This communication would not be complete unless some mention was made of the valuable contributions Duane has given ophthalmic science with regard to the importance of testing the accommodation in the examination of the refraction patient. If, as he has pointed out—and I think his position is unassailable—we meet with many cases of subnormal accommodation, we are overlooking a very important factor if we fail to carry out the very simple and quick method he has suggested for estimating the power of the accommodation.

With regard to the use of cycloplegics in refraction work, I can only say that I am a strong advocate of and systematically relax the accommodation in all ages up to forty years of age and, in many patients between forty and fifty. I find it necessary to complete my investigations with the aid of homatropine. With this brief statement I shall not further discuss this portion of the subject, as I understand it will be fully covered by another speaker.

The diagnosis of the various types of heterophoria and the association of these anomalies with the refraction error will likewise be discussed in another paper, so I shall not attempt to do more than to say that I regard these tests as a very essential part of the examination

and in the correction of the refraction error they play an important role. I do feel, however, that the multiplicity of methods which have been suggested for bringing to light the various phorias and for estimating the duction have created more or less confusion. In my own work in recent years I have largely confined my investigations of muscle balance to the use of the Maddox rod and rotary prism and this one method has usually given me satisfactory results. In executing any of the muscular tests emphasis should be laid upon the necessity for estimating the degree of heterophoria for both the distance and the near correction.

In concluding what I have attempted to present in a rather desultory fashion, I feel that in summing up the whole matter I cannot do better than to quote Duane, whose researches have contributed to such a great extent in putting refraction work on a scientific basis:

"I think the whole matter of handling refraction cases may be summed up in these two maxims: First, let us find out all we can about the eyes we are treating and the symptoms of which they are a part; using to this end every means that experience has proved to be helpful, never doing the work in a hurry, and remembering always that this work of all others requires patience, thoroughness, and accuracy.

"Second, let us constantly bear in mind the fact that we are treating patients, not eyes; that we are handling human beings, not machines; and that we cannot do our best work unless in each case we put ourselves in touch with the individual man before us, showing sympathy for his troubles, consideration for his infirmities, and an understanding mind, to take in all the physical and mental factors which may affect his outlook on life, and determine his need for refractive or other correction."

THE ETIOLOGY AND PATHOLOGY OF CANCER.*

By K. D. GRAVES, M. D., Roanoke, Va.

Cancer is one of the oldest diseases with which the human race is familiar. Even back in the days of Moses, the semibarbarian Egyptians recognized and respected it, treating it with caustics and escharotics. The oldest literature of India and Persia carried references to it. Hippocrates was cognizant of its dangers, and treated it by burning. Celsus, at the beginning of the Christian Era, excised cancer of the breast, advising against removal of the pectoralis major. Even during the dark ages men knew and dreaded it and speculated as to its cause.

The year 1824, in which the achromatic microscope was discovered, marks a new milestone in the history of cancer. An entirely new visualization of this disease was had, due to the study of the cells under the microscope. New theories were evolved in the scientist's study, to be exploded in his laboratory. Another era was ushered in in which practically every observer had a different opinion, each clamorously presenting his views on the subject, each unable or unwilling to admit his fallacies. The theories that cancer originated from the exuded elements of the blood, the specific cancer cell, etc., all had their noisy expounders, demanding recognition which, if given, was short lived.

Finally, Thiersch and Waldeyer proved conclusively the principle of the exclusive epithelial origin of cancer which is now generally accepted. In a word, this theory is that cancer can only arise from the epithelial type of tissue, and not from connective or lymphatic tissue. Cancer in the human is considered as being not hereditary, not contagious, possibly capable of being transmitted by grafting, probably being directly or indirectly influenced by such factors as trauma, irritation, X-ray burns, fetal rests, etc. Of these, probably one of the most important is trauma. Eliminating such factors as casual burns, surgical or accidental cuts, etc., such constant and repeated trauma as produces, day after day, erosion, crushing or bruising, is believed to lead to cancer. This is especially well illustrated in the chimney-sweep's knee.

We often see lesions which, for lack of a more comprehensive term we call "precancerous." Probably a better term would be "early cancerous." Experience has taught us that the little place on the lower lip, or the cervix, indurated and eroded, which does not seem to cause much discomfort but just does not heal up, microscopically often shows signs of activity, such as a few poorly differentiated cells which appear to be breaking through the basement membrane; or erosion with marked thickening of the surface epithelium, with here and there long or short fibrils of epithelial tis-

*Read as part of symposium on Cancer at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

sue reaching down into the underlying connective tissue. These are distinct sign posts marking the cross roads of divergence between benign and malignant growth and, if ignored, we all too soon realize our error and are brought face to face with a malignant reality.

Cancer may be visualized as normal epithelial tissue run amuck. In studying a microscopic slide of an epithelioma, for instance, we see the orderly line of the basement membrane suddenly broken, the cells lose their individual characteristics and become poorly differentiated, and show a marked tendency to spread by extension of growth. Outcroppings of the same type of growth appear deeper in the tissues, and we know by experience that this growth will continue unless checked by heroic measures. Cancer may be said, pathologically speaking, to recognize few laws and no restrictions.

In conclusion, I would say that, although cancer is one of our oldest and most dreaded and dreadful diseases, its causes are among the least well understood. Much has been accomplished in ruling out certain etiological factors. Much remains to be accomplished in the way of positive information. Why, for instance, should the wart on the face of a lady I saw last week, which she had nurtured for fifty years, suddenly take on such activity as to threaten her life, liberty and pursuit of happiness, if let alone? No one knows.

However, the eyes of the medical world are focused expectantly on the cancer problem, and we confidently hope that within the next few years the enigma of the why and wherefore of malignant disease will join the ranks of such diseases as syphilis, malaria and diabetes; which we predict will happen not through the study of manifest malignant changes, but through the careful routine examination and earnest consideration of those early deviations from normal tissue, which are termed "precancerous lesions."

Lewis-Gale Hospital.

SYMPTOMATOLOGY AND DIAGNOSIS OF CANCER.*

By W. H. RIBBLE, M. D., Wytheville, Va.

The symptoms of cancer, as laid down in the textbooks, are those of a new growth or ulceration. At first, these growths give so little trouble that the patient looks upon them lightly and does not consult the physician till there is a rapidly growing tumor, with adhesions to adjacent parts, metastases, extensive ulceration, cachexia, etc. When these symptoms have developed, the disease has usually gotten beyond control and 90 per cent of those affected have received their death sentence. To save this large per cent, we must look for the premonitory symptoms and deal with them before they become cancer.

The safest remedy for snakebite is to know the habitat of the reptile and kill the "snake in the grass" before he bites you. The safest remedy for cancer, likewise, is to know *its* habitat and what produces it, so that we may attack it in its incipiency.

When a section of cancer is placed under the microscope, we find the fibrous stroma filled with cancer cells, pre-natal epithelial cells, embryonic epithelial cells, or whatever we elect to call them. But all agree that they are epithelial. It is perfectly logical, therefore, to conclude that epithelial tissue is the habitat of cancer and, for the sake of argument, we will state that the cause of cancer is any persistent irritation which may provoke epithelial cells to excessive proliferation.

When the ovum is excited to cell proliferation by contact with spermatozoa, the epiblast, one of the three primitive layers of cells, gets busy, involutes and differentiates into anything from the delicate tissues of the brain to a toenail or tooth, according to what is needed at a particular point to perfect an organism.

After this active differentiation and proliferation has fulfilled its mission of construction, it quiets down to a simple maintenance of the tissue formed. But, let some persistent destructive or irritating agent continue to invade or irritate one of these tissues, and these epithelial cells are again excited to activity. They begin to proliferate rapidly, as they did in the vivified ovum. But they find no new tissue to form so they continue to proliferate blindly till they become so numerous that they cannot live or let live, and we have a cancer. If some of these cells get into a lymph channel, they migrate to glands, the liver, spleen, lungs, kidney, and even the bones, producing secondary or metastatic cancer.

Following up the idea, let us review the most frequent seats of cancer and see if they are not where the peaceful cell life is so

*Read as part of symposium on Cancer at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

molested that it becomes a case of "beware of the fury of a patient" cell.

The uterus is most frequently affected, next the breast, and we must admit that these organs (in the same order) are subjected to more stimulation and irritation than any other organs in the body. Fifty per cent of all cancers develop in the intestinal tract. Of the intestinal organs, the stomach is most frequently attacked, next the rectum, then the colon. (The small intestines are rarely affected). The stomach receives the ingesta, most frequently excessive in quantity, poorly masticated and of irritating nature. It passes into the small intestines in a liquid, partly digested state, with but little to create irritation. Passing into the colon, it becomes more solid, moves more slowly and often "rests," producing an irritating constipation or colitis. In the rectum (the cesspool of the body) it accumulates, becomes still more solid, and often "rests" quite a while and irritates the epithelial lining of this organ.

Fifty per cent of face cancers are located on the lower lip. Watch the lower lip and see how often it is between the teeth, how often it is bitten, moistened and dried, becoming fissured and abraded and how these abrasions are picked and bitten.

Conheim, observing that cancer shows a preference for the orifices, attributed this fact to "rests" from pre-natal embryonic complications; but, is it not just as likely that it is because the epithelium at the orifices is subjected to excessive irritation, by the sphincter muscles and what passes through the orifices?

I have seen cancer of the tongue, buccal mucous membrane and lower lip develop at a point of constant irritation by a rough tooth; one on the anus, where lack of cleanliness matted the hair and caused abrasion; and one on the heel, where a slight wound was kept irritated by a shoe. Does not all of this suggest that, if we look upon these chronic sores and neoplasms as being premonitory symptoms of cancer and deal with them radically, we may save many lives; and likewise, with chronic mastitis, uteri which are chronically affected, and with unyielding erosions of the cervix uteri?

The early symptoms of internal cancer are so obscure that they are seldom diagnostic, so an exploratory operation is being strongly advocated where there is a reasonable suspicion.

Lunger and Neuberger call attention to the presence of spirochetes in the gastric juice as of value in the diagnosis of gastric carcinoma. And Julius Friedenwald and George H. Grove, Trinkler and others have demonstrated the value of "the blood sugar test as an aid to the diagnosis of gastro-intestinal cancer." Articles on these two latter subjects may be found in the second volume of "*The Medical Interpreter.*"

I have purposely avoided a rehash of the symptoms and diagnosis of cancer with which we are all so familiar, and simply want to emphasize the fact that our cancer cases are dying and becoming more numerous and that we must do something that we have not been doing to alter this sad fact.

I remember hearing Dr. Joseph Price, of Philadelphia, read paper after paper on the subject of cancer and how he treated it. The last one was after he had lost his youthful enthusiasm and was about to "lay down de shovel and de hoe" and he was honest enough to say in the windup, "Gentlemen, all my cancer cases are dead."

I fear that most of us older men must subscribe to this statement but I hope you younger men may find some means to have better luck.

X-RAY TREATMENT OF CANCER.*

By B. E. RHUDY, M. D., Abingdon, Va.

It is fairly generally admitted that roentgenotherapy has a very prominent place among the so-called remedies or cures for cancer, radium and surgery being the only other therapeutic agents of popular use. Generally speaking, what can be accomplished with radium can be accomplished with roentgen rays and *vice versa*. However, there are cases which seemingly, because of their nature or peculiar location or extensiveness, are better adapted to treatment by roentgenotherapy, while there are others which are probably better treated by the application of radium. There are others which we are convinced should be treated by the means of both agents; especially do we have in mind malignancies of the genito-urinary apparatus.

For the best results the cases must be carefully selected and sometimes it is necessary to combine irradiation with surgery. If irradiation is used in conjunction with surgery, it is

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best used prior to it, but is also a very valuable prophylactic measure following operation.

It is generally conceded, I believe, that some means of irradiation, such as X-rays in conjunction with the introduction of radium into the uterine cavity, is considered the method of choice for treatment of all cases of primary cancer of the uterus. According to statistics of cases treated at the larger clinics, with irradiation properly carried out, we may expect a large percentage of cures in these cases.

It is stated, especially, by those who are using radium extensively, that operation is probably a mistake after all evidence of the tumor has disappeared; that if a cure has been produced, operation is unnecessary and, if it has simply caused degeneration of the tumor cells and their encasement in fibrous tissue, operation can only serve to destroy the framework of fibrous tissue and free the cells for further activity.

Prophylactic irradiation before and after operation has become quite popular, especially in cancer of the breast, and in many clinics post-operative irradiation is carried out routinely. The pre-operative treatment of breast cancer is much less popular but seemingly rests on a more scientific basis than post-operative irradiation, thereby minimizing the injurious effects of the operation. Objections to pre-operative irradiation are offered by some surgeons such as that the healing of the wound is delayed. On the contrary, a prominent surgeon recently stated that he had observed that in the cases which had received irradiation, the wound healed better and left a better scar. The objection that the operation is made more difficult is the one probably most frequently offered, except seemingly there is some increased tendency to hemorrhage; if performed immediately, it is difficult to conceive that such an objection is valid.

William S. Stone, in reviewing more than 10,000 neoplastic cases which have been under his observation during a service of seven years at the Memorial Hospital, New York City, the majority of which have received X-rays or radium treatment, states that he believes the adoption of pre-operative treatment in mammary cancer will show that the field of applicability of the radical operation should be much restricted, and that it occurs to him that the presence of hard, fixed nodes in the apex of the axilla makes the case as unsuitable for a radical operation as does the presence of supra-clavicular nodes. It is a question then, how long it will be before the radical operation for breast cancer will be entirely discarded.

The results of the use of X-rays and radium on the osteogenic tumors, which are frequently applied on account of their inaccessibility to surgical procedures, because of their peculiar location, leads one to think that with their earlier recognition by means of clinical history and X-ray study, irradiation may prove to be an efficient substitute for incision and curettage or even amputation.

The treatment of malignant conditions of the skin is probably one of the most useful fields of irradiation as well as the most satisfactory. The malignancies of the skin that we are frequently called upon to treat are the squamous-celled and basal-celled epitheliomata. The basal-celled epitheliomata is one of the most satisfactory types of malignancies to treat because of its slow course and because it frequently does not involve the surrounding lymph nodes. Radiotherapy seemingly is the treatment of choice for these lesions, because of the ease or simplicity and painless application, to say nothing of cosmetic results, the production of a soft and relatively small scar; the latter is often to be considered, inasmuch as these lesions so frequently occur about the face. Frequently it is possible to keep this type of malignancy under control in the more extensive growths and to apparently produce a permanent cure in many of them. Irradiation of superficial lesions should be carried out deliberately, for it is better to give a little too much than to give too little. In conjunction with the thorough irradiation of the entire field of the primary lesion, the regional lymph nodes should be thoroughly irradiated, with the view of closing the lymphatics. We must keep in mind the likelihood of extension by metastasis for we can no more hope for results by treating a portion of the tumor than can the surgeon hope for success by removing only a portion of it.

In dealing with the treatment of malignancy of any part of the human body by roentgen ray therapy we are at once confronted with difficulties, due in the first place to the lack of definite knowledge as to the extent of invasion

of adjacent and deeper structures; in the second place, to the inaccessibility of the deeper parts of the growth to effective radiation; and in the third place, the effect the rays will have on the cells of the normal tissues. To treat properly any malignant tumor, one must know, if possible, the effect of X-ray upon the normal as well as the malignant cells.

There has been comparatively little work done, until just recently, to show the effect of radiation on the normal tissue. The introduction of any therapeutic measure has always been accomplished by an over-estimation of its curative powers which, in the course of time, had to be modified when a more mature judgment prevailed. In roentgen ray therapy, especially when using the more penetrating or short wave length rays, we are threatened with a set-back on account of a variety of injuries resulting from the therapeutic application of the rays. Roentgen injuries have occurred and will occur in the future, and cannot be avoided with absolute certainty, but irradiation is comparatively safe in the hands of a competent operator. These injuries may be divided into two groups: local and general—injuries caused by exceeding the tolerance of tissues and resulting from defects of radiation technique. Local injuries must be distinguished from general or systemic injuries such as acute blood tissue injuries or destruction of the red blood corpuscles. Destructive changes in the blood occur during each therapeutic irradiation which is employed for the destruction of pathological cells; therefore, it is important to have the patient entirely screened or protected from the rays, leaving only the area intended to be treated exposed. Other injuries sometimes caused by irradiation are often spoken of as "roentgen sickness" which may include nausea, vomiting, headache, and perhaps diarrhea. This probably can be much alleviated, in most cases, by proper preliminary preparation, as well as proper screening and ventilation during period of irradiation.

The general health of the patient must be considered also, because of the so-called toxemia which results from irradiation—a subject which deserves much consideration, especially in case of elderly persons. A complete blood count and hemoglobin should be made and repeated at intervals on all cases. This should be used as a guide in carrying out treatment for any malignancy. Transfusion may at times be quite beneficial.

In observing the general condition of the health, it is important to determine the status of patient, whether certain findings are due to hemorrhage or from a necrotic tumor from cachexia or from metastasis.

Generally speaking, the therapeutic results of irradiation depend upon the size, extent and condition of the tumor; the size, however, is of less importance than the extent and condition. For instance, if it has extended to the bone tissue or cartilage, the results are less favorable. Infected neoplasms respond very unfavorably to irradiation, and a prognosis should be carefully guarded in these cases.

Because of the condensation of such a big subject as treatment of cancer by roentgen ray therapy, one can scarcely do more than generalize; therefore, I have purposely refrained from touching upon the technical phase of this subject; also I have refrained from presenting even a resumé of the results in the cases which we have treated, as too short a period has elapsed since we commenced using roentgen ray therapy in the treatment of malignancies to venture to speak in terms of cure. However, I shall be very glad to report at some future time on a series of cases which we are now treating.

In conclusion, it may be stated with little fear of being too radical that, in addition to supplanting surgery as the method of choice in a number of types of malignancy, irradiation has greatly limited the field of application of radical surgical procedure in many others. The use of X-rays and radium, therefore, have made greater refinement in diagnosis essential. To this end the patient's welfare is best conserved by obtaining the co-operation and knowledge of the internist, pathologist, surgeon and roentgenologist.

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VITALIZING OBSTETRIC RECORDS.*

By M. PIERCE RUCKER, M. D., Richmond, Va.

Case notes serve at least three functions, two immediate and one remote. First, the act of taking notes promotes accuracy of observation and thoroughness. The second immediate reason for a case history is that it is a guide for the management and treatment of the case, all the more important as methods of precision become more numerous and complicated. Finally, the notes are a permanent record of your work. When properly kept and utilized, they are the raw material for statistical studies. It is to this phase of the question that I wish to direct your attention.

Beginners in medicine are prone to attach too little importance to the two immediate functions of clinical records and too much importance to their satistical use. The fourth year medical student and the hospital interne hear so much about a series of 500 cases of this or a 1,000 cases of the other that they get the idea that the chief use of the record which they are struggling so to keep up, is to fit into some more extended series. When these same sheets are dumped into closets and store rooms in more or less hopeless confusion, the tyro loses heart and his note-taking suffers in consequence.

In my experience with medical students, the best way to promote the habit, I might almost say the love, of history-taking is to make the histories available to the students themselves and to encourage their use of them. The histories of the out-patient obstetrical department of the Medical College of Virginia are indexed and bound, and the bound volumes are kept in the library. The cases are indexed not only by name, but also by parity, presentation, methods of delivery, complications, etc., so that the students can easily find out what the experience of their predecessors has been in any problem in which they may be interested. To further stimulate this interest, Dr. Baughman, as a part of the regular didactic work, assigns to each student some simple problem to be worked out from these records. In this way the men get in a practical manner, an idea of how provoking it is to have to throw out this case because the race is not stated or that one because the age or parity is left off, or the other one because the ultimate result is not known.

With the idea of making our records even more available, for the last eighteen months I have been working out a system of coding each case, so that it can be put on a card with a number of punched holes in such positions that the cases can be analyzed by machinery as is done in the Census Office and elsewhere. The idea was first suggested to me by Mr. M. N. Fisher, Statistician for the State Industrial Commission, who very kindly made me a provisional code from which the code we are now using has gradually developed. I might say that for the very reason that the code has grown as the work grew, the arrangement is not always logical, and that there are a number of minor changes I would like to make in it, but to do so would necessitate my destroying all the cards that have been punched, and beginning all over again. The code gives a number to each phenomenon we wish to consider, just as the International Classification of the causes of death gives a definite number to each disease or cause of death, the difference being that the code can be changed to suit the needs of any particular study. Pearl* has shown the uses it can be put to in general hospital work and in the department of urology. The code I submit is designed to meet the needs of obstetrics and minor gynecology.

CODE FOR ANALYSIS OF EXPERIENCE IN THE PRACTICE OF OBSTETRICS.

CASE NUMBER (1-5)	
Previous admission	x
M. C. V.	y
CONJUGAL CONDITION (6)	
White	1
Colored	2
Single	x
Widowed	y
AGE (7-8)	
Previous Cesarean section	x
Previous eclampsia	y
PREVIOUS CHILDREN (9-10)	
Twins	x
"Several"	y
NUMBER OF MISCARRIAGES (11)	
"Several"	x
Previous ectopic	y

*Read at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, October 31-November 3, 1922.

*Pearl, Raymond: Modern Methods in Handling Hospital Statistics, Bull. Johns Hopkins Hosp. XXXII: 184, 1921.

HEART (12)

Normal	0
Systolic murmur	1
Aortic murmur	2
Irregular	3
Presystolic murmur	4
Organic disease (broken compensation)	5
Endocarditis	6

LUNGS (13)

Normal	0
Tuberculosis	1
Bronchitis	2
Cough, no rales	3
Healed tuberculosis	4
Asthma	5
Pleurisy	6

WASSERMANN (14)

Negative	0
Positive, one plus	1
Positive, two plus	2
Positive, three plus	3
Positive, four plus	4
Previous positive reaction	5
Treated	x

BLOOD PRESSURE (15)

100 or under	1
101 to 149	2
150 to 199	3
200 and up	4

URINE (16)

Normal	1
Albumen, trace	2
Albumen	3
Sugar	4
Casts	5
Pus	6
Blood	7
Retention	x

PELVIS (17)

Normal	1
Justo-minor	2
Flat	3
Flat contracted	4
Funnel	5
Justo-major	6
Nagele	7
Kyphosis	8

ATTENDANCE (18)

Hospital	1
Home, unattended	2
Home, physician	3
Midwife	4
Another physician	5
Consultation	6
Office	8
Students	x
Prenatal care	y

TOTAL DURATION OF LABOR IN HOURS (19-20)

Dry labor	x
Precipitous labor	y

DURATION SECOND STAGE IN MINUTES (21-22)

Two hours	x
Three hours or more	y

PRESENTATION (23)

R. O. A.	1
L. O. A.	2
R. O. P.	3
L. O. P.	4
Face	5
Brow	6
Breech	7
Shoulder	8
Not pregnant	9
Twins	x
Triplets	y

OPERATION (24-25)

Bags	x (over 25)
Accouchement force	y (over 25)
Packing vagina	00
Version	1
Potter's version	2
Secondary repair vag. outlet	3
Opening vulvo-vaginal abscess	4
Hysterectomy	5
Breech extraction	6
Induced abortion (drugs)	7
Induced abortion (instrum.)	8
Cleidotomy	9
Spontaneous delivery	10
Forceps, low	20
Forceps, mid.	30
Forceps, high	40
Scanzoni forceps	33
Deliv. of placenta	50
Cesarean section, classical	60
Cesarean section, Porro	61
Cesarean section, extra-uterine	62
Cesarean section, sterilizing pt.	65
Cesarean section, low incision	63
Cesarean section, vaginal	66
Cesarean section, post mort.	67
Emptying uterus manually	64
Craniotomy	70
Curettage	80
Opening breast abscess	90
Pubiotomy & spontaneous	11
Pubiotomy & low forceps	21
Pubiotomy & mid forceps	31
Pituitrin and spontaneous	12
Pituitrin & low forceps	22
Pituitrin and mid forceps	32
Pituitrin and version	52
Ritgen's Maneuver	13
Bougie and spontaneous	14
Castor oil and quinine	15
Laparotomy	97
Manual replacement retroverted uterus	98
Radium	99

ANAESTHETIC (26)

None	0
Gas oxygen	1
Morphine	2
Chloroform	3
Ether	4
Gas and chloroform	5
Gas and ether	7
Ethyl chloride (local)	9
Scopolamine	x
Chloral hydrate	y

PERINEAL CONDITION (27)

Intact	0
First degree laceration	1
Second degree laceration	2
Complete tear	3

Episiotomy ---- 4
Old lacerations ---- 5
Old lacerations complete ---- 6
Ulcers ---- 7
Old lacerations ---- x

DAYS IN BED (28-29)

PLACENTA (30)
Duncan ---- x
Schultze ---- y
Intact ---- 0
Retained ---- 1
Succenturiate ---- 2
Velementous insertion of cord ---- 3
Infarcts ---- 4
Portions retained ---- 5
Syphilitic ---- 6
Single (twin cases) ---- 7
Cotyledonous ---- 8
Prolapsed ---- 9

COMPICATIONS (31-32)
Sepsis ---- x
Ophthalmia ---- y
Fractures, bones of child ---- 00
Eclampsia ---- 1
Placenta previa ---- 2
Ablatio placenta ---- 3
Abortion ---- 4
Extrauterine pregnancy ---- 5
Ruptured uterus ---- 6
Postpartum hemorrhage ---- 7
Mastitis ---- 8
Phlebitis ---- 9
Purpura ---- 10
Eclampsia and placenta prev. ---- 11
Fracture of pelvis ---- 12
Toxemia ---- 13
Cholecystitis ---- 14
Floating kidney ---- 15
Retention of urine, postpartum ---- 16
Prolapsed cord ---- 17
Cystocele ---- 18
Cracked nipples ---- 19
Threatened abortion ---- 20
Pernicious vomiting ---- 21
Hysteria ---- 22
Mental derangement ---- 23
Amniotic adhesions ---- 24
Endometritis ---- 25
Acephalic child ---- 26
Anemia ---- 27
Pruritus ---- 28
Psoriasis ---- 29
Bichloride poisoning ---- 30
Backache ---- 31
Abscess of labia ---- 32
Cystitis ---- 33
Pressure on bladder ---- 34
Tongue tied ---- 35
Cleft palate ---- 36
Spina bifida ---- 37
Hydrocephalus ---- 38
Hemorrhoids ---- 39
Pyelitis ---- 40
Broncho-pneumonia ---- 41
Convulsions (baby) ---- 42
Scars of vulva from burns ---- 43
Caked breasts ---- 44
Polydactylism ---- 45
Prolapsed arm ---- 46
Torn urethra ---- 47
Hydramnion ---- 48
Hot water bottle burns ---- 49
Hemorrhage from the cord ---- 50
Retinitis ---- 51
Anesthetic death ---- 52
Minor deformities ---- 53
Shock ---- 54

CONDITION OF MOTHER (33)
Bad ---- 1
Fair ---- 2
Good ---- 3
Died ---- 4
Ununited lacerations ---- 5

CONDITION OF CHILD (34)
Boy ---- x
Girl ---- y
Drowned ---- 9
On discharge:
Bad ---- 1
Fair ---- 2
Good ---- 3
Abortion ---- 4
Miscarriage ---- 5
Still born ---- 6
Died in first 14 days ---- 7
Congenital heart disease ---- 8
Hematoma of scalp ---- 9

LENGTH OF CHILD IN CM. (35-36)
Premature ---- x
Postmature ---- y

ATTENDANT DISEASES (37-38)
Influenza ---- 1
Malaria ---- 2
Otitis media ---- 3
Furuncles ---- 4
Mumps ---- 5
Tuberculosis ---- 6
Fibroid ---- 8
Condyloma ---- 9
History of Syphilis ---- 10
Pneumonia ---- 11
Cancer of breast ---- 12
Bronchitis ---- 13
Patent urachus ---- 14
Typhoid ---- 15
Pleurisy ---- 16
Amebic dysentery ---- 17
Pericarditis ---- 18
Polydactylism (see 45, col. 31-32) ---- 19
Congenital goiter ---- 20
Hernia ---- 21
Appendicitis ---- 22
Measles ---- 23
Bell's paralysis ---- 24
Enteritis ---- 25
Fall ---- 26
Husband has tabes ---- 27
Psoriasis (also 29 col. 31-32) ---- 28
Idiot or feeble minded ---- 29
Exophthalmic goiter ---- 30
Intestinal obstruction ---- 31
Infected tooth ---- 32
Scabies ---- 33
Rheumatic pains ---- 34
Rigor mortis ---- 35
Burns ---- 36
Exploratory laparotomy ---- 37
Gonorrhoea ---- 38
Hook worm ---- 39
Tonsillitis ---- 40
Bubo ---- 41

Pellagra ---------- 42
Diabetes ---------- 43
Hypothyroidism ---------- 44
Whooping cough ---------- 45
Morphin poisoning ---------- 46
Epilepsy ---------- 47
Ovarian cyst ---------- 48
Trypanosomiasis ---------- 49

AUTOPSY (39-40)

Broncho-pneumonia ---------- 1
Negative ---------- 2
Cerebral hemorrhage ---------- 3
Endocarditis ---------- 4
Syphilitic bone changes ---------- 5
Obstructed glottis ---------- 6
Hemorrhagic disease of new born ---------- 7
Enlarged spleen and liver ---------- 8
Enlarged thymus ---------- 9
Degeneration of liver ---------- 10

Palpable colon ---------- 6

Head and Chest (43)

Normal ---------- 0
Headache ---------- 1
Tonsillitis ---------- 2

The technic of using the code is as follows: With the code at hand, the case histories are reviewed and a work sheet is made. (Fig. 1). Each line of the sheet represents a case. This grouping of cases often gives you unexpected information. One group of students may have more than their share of infections and investigation shows a break in technic.

In going over our past records, I was struck with the number of still births a certain group

M.C.V. **Obstetrical Histories, Coded**

Form D66—1M

COLUMN	6	7-8	9-10	11	12	13	14	15	16	17	18	19-20	21-22	23	24-25	26	27	28-29	30	31-32	33	24	35-36	37-38	39-40
Case No.	Old Hospital	Age	Children	Abortion	Heart	Lungs	Wass.	Blood Pressure	Urine	Pelvis	Anesthesia	Total Duration	Duration 2nd Stage	Presentation	Operation	Anesthetic	Presence	Days in Bed	Pyrexia	Complications	Cond. of Mother	Cond. of Child	Length of Child	Autopsy Diagnosis	Autopsy
1520	2	41	9	0	1	0	0	2	/	/	3 y	12	8	2	10	0	1 x	9	0 y		3	3 y	46		
1521	2	30	4	0	0	0	0	1	1	1	1 y	31		2	10	0	0	9	0 y		2	3 y	46		
1522	2	29									3 y	4	40	2	10	0	1	9	0 y		3	3 x	50		
1523	1	21	0	0	0	0				1	3 x	31	4	1	10	0	1	9	0 y		3	3 y	48		
1524	2 x	15	1	0	0	0				1	3 x	22	x	1	10	0	1 x	9	0 y		3	3 x	49		
1525	2 x	23	1	2	0	0	4 x	2		1	3 y	17	x	2	10	0	0	9	0 y		3	3 x	50		
1526	2	29	7	0	0	0	0	1		1	3 y	24	4	2	10	0	0 x	9	4 y		2	3 x	49		
1527	2	29	7	0	0	0	0	2	1	1	3 y	19	4	1	10	0	1 x	9	0 y		3	3 x	48		
1528	2	25	2	1	0	0	0	1		1	3 y	11	10	1	10	0	0	9	4 y		3	3 x	47		
1529	2	24	1	3	0	0	0	2		1	3 y	7	20	1	10	0	0 x	9	4 y	8	3	3 y	47		
1530	2	39	7	1							2 x			2 x	10	0	0	9	7 y	50	3	3 x	41		
1530	2	39	8	1							3			7 x	10	0						3 x	43		
1531	2	22	1	1	1	0	0	1		1	2 y	4	30		10	0	1 x	9	0		3	3 y	49		
1532	1	23	2	0	0	0	0	2		1	3 y	9	10	2	10	0	1	9	0 y		3	3 y	48		
1533	2	19	1	0	1	0	2	2		1	3 y	7	25	2	10	0	0	9	0 y		3	3 x	50		
1534	2 x	25	0	1	0	0	0	2	1	1	1 y	73	45	1	10	0	0	9	4 x	2	3	3 y	45		
1535	2	21	2	0	0	0	0	2		1	3 y	8	60	1	10	0	1 x	9	0 y		3	3 x	43		
1536	2 x	19	2	0	0	0				1	3 y	8	38		10	0	2	9	0	7	3	3 y	48		
1537	2	22	2	0	0	0	0	2	1	1	3 y	7	10	2	10	0	0	9	0 x		3	3 y	46		

Fig. 1.

POST PARTUM EXAMINATION

Vaginal (41)

Anteflexed ---------- x
Retroflexed ---------- y
Cervix intact ---------- 1
Lateral tear ---------- 2
Bilateral tear ---------- 3
Stellate tear ---------- 4
Cystocele ---------- 5
Rectocele ---------- 6
Subinvolution ---------- 7
Erosion ---------- 8

Abdominal (42)

Normal ---------- 0
Flaccid ---------- 1
Anal fissue ---------- 2
Adenitis ---------- 3
Enlarged liver ---------- 4
Enlarged spleen ---------- 5

had (six in twenty-three full term deliveries). These boys had no case to last more than ten hours and no second stage more than thirty minutes. On inquiry it was learned that these two men were accustomed to lighten their labors with pituitrin, but were afraid to put it on their histories. Habitual carelessness stands out glaringly on the work sheet.

The work sheets furnish the data from which the operator punches the cards. (Fig. 2). They should be preserved as a useful summary of the work and as a supplementary index. Suppose, for instance, you wished to look up a recent case and remembered it only by some un-

usual feature, say a kyphosis. It would be a simple matter to run down column seventeen on the last few work sheet and pick out "8," and save yourself the trouble of running all the cards through the sorting machine. The punched cards serve as the best possible index. Should you wish to study any complication or combination of complications, the cards will give the case numbers of these histories at the

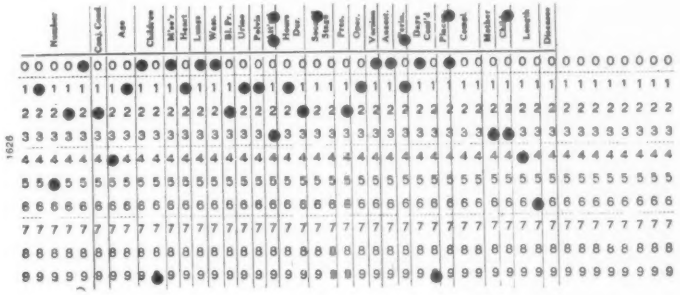

Fig. 2.

rate of one minute for every three hundred cards.

When the cards are punched, you have your material in the most workable form. It is only a question of a few minutes of machine work to sort out and count any phenomenon or combination of phenomena that you have on your cards. To illustrate, let us take some problem. I might say here that in common with all statistical methods, the plan and scope of the work must be carefully thought out in order to avoid glaring errors. If we wanted to know the effect of Cesarean section upon fetal mortality, our records would be worthless, not that there are no sections, for the series includes twenty such operations, varying in details from the classical operation to the post-mortem Cesarean section. The operators were the leading surgeons in Richmond, yet the fetal mortality was sixty-five per cent. It is hardly conceivable that even the poorest operator would have such a fetal mortality. The fault lies not with the operator nor with the operation, but with our selection of cases. The fetal mortality was due not to the method of delivery, but to the maternal complication for which the operation was done. One was done for pelvic indications, one on account of intestinal obstruction, two on account of ruptured uterus, three on account of placenta previa, three on account of uterine fibroids, four on account of toxemia, and five on account of eclampsia. Three mothers died, one of those with ruptured uterus, and two of the eclamptics. Thirteen, or sixty-five per cent, of the babies were lost.

A more suitable study is one that concerns the duration of labor. If it is desired to know the duration of labor according to parity, Table I furnishes the information, while the effect of the duration of labor upon fetal mortality is shown by Table II.

TABLE I.

SHOWING THE DURATION OF LABOR ACCORDING TO PARITY.

No. of Previous Children	No. of Cases	Average Duration of Labor.
Unknown	31	9 hrs.
None	256	20½ hrs.
One	110	13 hrs.
Two	66	14 hrs.
Three	57	11 hrs.
Four	32	12½ hrs.
Five	23	14½ hrs.
Six	17	17 hrs.
Seven	15	15 hrs.
Eight and over	28*	26 hrs.

*Includes one case 80 hours, one case 94 hours, and two cases over 99 hours.

TABLE II.

SHOWING FETAL MORTALITY IN RELATION TO LABOR OF VARYING DURATION

Duration Period (hrs.)	No. Cases	Still Born	Died in First 14 Days	Total Mortality	Percentage of Mortality
0- 6	125	6	4	10	8.0%
7-12	204	17	3	20	9.8%
13-18	122	7	4	11	9.0%
19-24	66	5	2	7	10.6%
25-36	60	3	1	4	7.0%
37-48	23	3	1	4	17.4%
49-60	10	2	--	2	20.0%
61-72	11	5	--	5	45.5%
73-up	7	3	--	3	43.0%
Total	628	51	15	66	10.5%

While there is nothing particularly new in the information furnished by these tables, it is interesting to note in Table II how the numbers in column four, shifted over to the still born column as the duration of labor increased. What is especially interesting about these tables, however, is that the figures upon which they are based were furnished by the tabulating machine in sixty minutes from among 1,200 cards. In other words, the machine reviewed 1,200 cases, discarded those that did not supply the necessary information, separated the remainder into groups, and counted each group within one hour.

Conclusions.

Coding case histories is valuable; first because it causes a careful review of the history and therefore promotes better history taking, second because it puts the data in the most available and usable form.

1600 *Park Avenue.*

DISCUSSION.

Dr. George T. Myers, Norfolk: Dr. Rucker's paper is a step in the right direction. Relative to still-births, I think the classification of still-births, to a large extent, should be changed. The only thing is the still-birth. In eliminating any surgical condition we are confronted with too large a mortality for still-births. If a child is alive during pregnancy, unless the labor is unduly long, my contention is that, if that child is alive prior to the Cesarean operation, I do not see why it should not be delivered alive, unless the case has been neglected.

Statistics are often misleading. I am personally against statistics as a whole. Take the Cesarean section: I contend that it ought not to be done unless it is to save the living child; if other operations have been tried before and failed, then the operation is contra-indicated.

I say again that I think Dr. Rucker's paper is a step in the right direction.

Dr. Rucker, Richmond (closing): I have very little more to say upon the subject. In regard to the Cesarean section, there should be no fetal mortality attending the cesarean section. I merely brought this out to show the limitations of statistics.

Some people think you have proven something if you give a lot of statistics and quote a group of figures. You can readily see how someone inexperienced in statistics can dig out a group of cases and argue for or against the Cesarean section and convince some people.

THE USE OF QUINIDIN IN CARDIAC DISORDERS.

By J. MORRISON HUTCHESON, M. D., Richmond, Virginia.

From the rather extensive clinical testing to which quinidin has been subjected during the past few years it seems evident that the drug has a distinct field of usefulness in cardiac therapy. Its mode of action is not thoroughly understood yet certain of its effects are quite constant and there is general agreement as to what cardiac conditions it is apt to influence favorably. Quinidin is not, however, a harmless drug and must be employed with the greatest care if its desirable effects are to be obtained and its dangers avoided.

Save for an occasional allusion to the tonic effect of quinin on the heart, the first reference to the clinical use of cinchona derivatives in heart disease was made by Wenckebach in 1914. His attention had been called by a patient to the effect of quinin on an irregularity known to be fibrillation and in this way he was led to try the drug in a number of similar cases. When his observations were published, the number of favorable results was so small as to attract little attention. Other investigators also obtained comparatively poor results with quinin, but the occasional effect of the drug on fibrillation led Frey to investigate the action of the other three alkaloids of cinchona, and in this way the remarkable properties of quinidin were discovered. Frey reported in 1918 that of 22 cases of fibrillation treated by him with quinidin, eleven regained normal rhythm, and, according to a number of other observers who have repeated his work, these figures indicate about the proportion of cases of fibrillation in which good results may be obtained.

The general effect of quinidin on the heart appears to be depressant, and is exerted directly upon the cardiac muscle. Excitability is diminished so that extrasystole or fibrillation cannot be produced artificially and conduction is lowered in auricle, ventricle and junctional tissues. Various types of block have been produced experimentally but these have rarely if ever been observed in the clinical use of the drug.

The manner in which quinidin acts on auricular fibrillation is still uncertain and is apt to remain so until the nature of fibrillation itself is better understood. According to Lewis and his co-workers, quinidin prolongs the refractory period in the auricle and delays the recovery of the tissue, thus shortening the gap between the crest and wake of the circulating wave and eventually abolishing it and allowing normal impulses to regain control. On the other hand, quinidin also depresses conduction in the auricular muscle, a condition which favors the re-entry of the excitation wave and lengthens the gap. It would seem, therefore,

that the results of quinidin therapy in a given case would depend upon which of these somewhat antagonistic effects predominates.

When quinidin is given to a patient with fibrillation, the first effect is a slowing of the auricular rate with larger and more regular P waves in the electrocardiogram, a condition approaching auricular flutter. This occurs in the majority of cases treated while in about half the cases the rhythm rapidly changes to normal. On the other hand, digitalis, which has been our main reliance in fibrillation, influences the rhythm little or not at all. Its good effects come from diminished conduction in the bundle of His, thus allowing fewer impulses to flow to the ventricle with consequent slowing of the ventricular rate.

Improvement after quinidin therapy comes as the result of restored normal rhythm, and is often most striking in those patients with fibrillation who are uncomfortably conscious of irregular heart action. Cardiac efficiency may also be favorably influenced by the removal of the additional burden of disordered rhythm, but the direct effects on decompensation which follow digitalis administration are not to be expected from quinidin.

Where normal rhythm has been restored by quinidin, it is usually necessary to continue the drug either in small daily doses or intermittently. The duration of the effect is variable, lasting from a few days to several months. Frey states that two-thirds of his cases maintained a normal rhythm for at least one month.

The dangers from quinidin in heart cases are considerable, and should constantly be borne in mind. Certain individuals appear to possess an idiosyncrasy for quinidin just as they do for quinin and alarming symptoms, such as sudden loss of consciousness with standstill of respiration, have been observed to follow even small quantities of the drug. It has, therefore, become customary to precede quinidin therapy by single test doses of 3 to 4 grains of the drug in order to ascertain whether or not any such hypersusceptibility exists. Toxic symptoms, such as giddiness, tinnitus, intestinal cramps, and urticaria invite caution, but are not as a rule of serious import. Marked weakness, precordial distress or increasing breathlessness indicate withdrawing the drug promptly. Increasing ventricular rate, unless it marks the advent of auricular flutter, should also be regarded as a danger signal.

In cases with auricular fibrillation a certain amount of clotting in the auricles is prone to take place, so when normal rhythm is resumed and the auricle contracts fully, these clots may be detached. To this extent, therefore, quinidin favors embolism, and several deaths from this cause have been reported during its use.

Up to the present time, clinical observations on quinidin have dealt chiefly with auricular fibrillation, though the drug has been also frequently used with good results in premature contractions and to prevent the seizures of paroxysmal tachycardia. In the latter conditions small doses have seemed to be effective and the dangers attending its use less than with fibrillation.

Auricular fibrillation occurs either as a transient affair lasting a few hours or a few days or, more commonly, as a permanent malady existing until death. Quinidin is much more effective in the transient than in the permanent type and all observers agree that the shorter the duration of the fibrillation the greater the likelihood of restoring normal rhythm. Where fibrillation is accompanied by definite signs of decompensation, digitalis should be the remedy chosen, as the depressing effect of quinidin on the heart muscle is likely to outweigh the possible benefits to be derived from changed rhythm. Where compensation has been restored, however, and the heart digitalized, quinidin may be used as the seemingly antagonistic action of the two drugs on the auricular muscle has not been apparent clinically.

Quinidin is generally administered in the form of the sulphate. Where no idiosyncrasy is shown to exist, the initial dosage may be three grains three times a day, and this may be rapidly but cautiously increased to as much as fifteen grains thrice daily. If untoward effects occur, or if normal rhythm develop, the drug must be stopped promptly.

The following case illustrates the method of using quinidin and the manner in which a favorable effect manifests itself:

A farmer, aged 30, was admitted to the hospital January 17, 1923. He complained of palpitation, especially at night, and shortness of breath on exertion, with slight swelling of the feet. There was a history of rheumatic fever in early life, and physical examination revealed typical mitral stenosis. The pulse was 90, irregular, and the electrocardiogram showed auricular fibrillation with left ventric-

ular preponderance. Digitalis had been given, but as no apparent effect had been produced it was continued in larger doses for several days. The pulse rate diminished somewhat, but the subjective symptoms continued, so quinidin was begun, giving three grains the first day and increasing the dose to six grains three times a day. At this point the heart rate rose to 130 but as the electrocardiogram revealed an impure flutter the same dose was maintained with the result that on the following day the rhythm was normal. There have been several recurrences of irregular heart action but these are easily controlled by a few three grain doses of quinidin and there has been no further necessity for digitalis. Subjective relief has been marked and, as the result of more orderly rhythm, the cardiac reserve appears to have improved.

It is difficult as yet to estimate the relative importance of quinidin among cardiac drugs. That it will cause the auricle to cease fibrillating has been clearly demonstrated and the clinical results of this change are often brilliant. It is also of value in the management of other disorders of rhythm of less significance. On the other hand it must be remembered that normal rhythm is restored in only 50 per cent of cases to whom quinidin is given according to our present technique of administration, and not all of these show clinical improvement. Wolferth estimates that only about half, or 25 per cent, of the whole number treated by quinidin gain appreciably in cardiac efficiency. These facts together with the dangers incident to the drug itself place certain definite limitations upon its usefulness.

When quinidin therapy is undertaken, it should be with a full knowledge of the condition to be treated and with ample facilities for thorough management and accurate observation of the patient. The classification of arrhythmia is often impossible without the aid of graphic studies, while changes from fibrillation to flutter can be detected only by the electrocardiograph. According to Lewis, "it is a treatment emphatically for the wards rather than for use in an outpatient department." With our present knowledge of the possibilities of quinidin, it should certainly be carefully considered in every case in which the auricles fibrillate, but used only after every contraindication has been eliminated and under the strictest supervision.

209 *Professional Building.*

TWO COMMON DISEASES IN CHILDREN OFTEN OVERLOOKED.*

By CHARLES E. CONRAD, M. D., Harrisonburg, Va.

I wish to direct your attention to two common conditions occurring in children which are often overlooked. Both occur frequently in the practice of every general practitioner and can easily be detected if looked for. The two I have in mind are acute otitis media and pyelitis. One point I wish to especially bring out in regard to acute otitis media is that you can have this condition existing and the drum almost ready to rupture, or it may go to the stage of rupturing without pain.

What I have to say is nothing new, but as I saw in an article appearing in the *Journal of the A. M. A.*, about encouraging breast feeding: "While we all realize it we must keep repeating it as the surgeons did appendicitis until every man not only knows it but puts it in practice."

Unless there is some direct symptom calling attention to the ears or kidneys, they are often overlooked. The diagnosis of many unaccounted for fevers in children will be cleared up and explained if the ears and urine are examined.

The chief point I wish to bring out and leave with you relative to acute otitis media is, as I stated before, that it can exist without pain, and the best way I know to show this is to give a few histories of it in children who are old enough to tell intelligently what hurts them.

D. Y., age five years. Mother called me on account of child having a fever. On examination, I found the child with a temperature of 103° F. She was not complaining in any way. Throat was normal, lungs normal to percussion and auscultation, heart normal, abdomen soft, not tender, no masses felt, no glandular enlargement, stools normal, urine normal, and, in fact, a complete negative examination except for one ear. The left drum was very red and inflamed but not bulging; right drum normal in appearance. Temperature ranged from 98.2° in the morning to 103.5° in the evening, until the fourth day when it went to 104°. At this time the right ear became involved. Fever from then on dropped by lysis, reaching normal in the afternoon of the tenth day. This child never showed any other complications

*Read at the meeting of the Medical Association of the Valley of Virginia, in Winchester, May 31, 1923.

during her illness, and at no time did she have any pain in either ear.

E. B., age seven years. In this case I was called on account of the child having fever but presenting no other symptoms. On examination, I found him with a temperature of 106° F. General physical examination was negative except both ear drums were very red and inflamed but neither drum bulging. He had not had any pain in either ear and when asked said they did not hurt him. I ordered some local treatment that night. The next morning, his mother said he had been delirious during the night and, as the drums were bulging, a paracentesis was done by Dr. E. R. Miller of Harrisonburg. There was a very free drainage of pus from both ears, and he never complained of pain except when ears were irrigated. Temperature dropped to normal in four days, and child made a complete recovery without any complications.

E. S., age twelve years. In this case, I found a boy, with temperature 104°, suffering with headache, severe pain in right shoulder joint and back of neck; on examination shoulder very sensitive to pressure and movement, some neck rigidity and pain on being flexed, moderate Kernig; his movements were somewhat jerky, physical examination otherwise negative. The above, with the history of having vomited the night before, made me somewhat suspicious of a meningitis, and I decided if he was not improved in the morning I would do a lumbar puncture. Much to my surprise, when I returned in the morning I found a very different picture. The boy had a normal temperature, looked very comfortable, no neck rigidity nor Kernig, and very little pain in shoulder, but what I did find was a freely discharging right ear which the mother told me had "broken" during the night. As it was in the middle of summer and a very hot spell, I had failed to look at the ear the night before, much to my embarrassment that morning. He had no further rise in temperature and recovered rapidly. At no time did he have any pain in his ear.

M. B., age twelve years. On March 16, child had pain in ear at night which subsided before morning. On 18th, Dr. J. E. Wine, of Harrisonburg, was called and obtained the above history with the addition that she had been well Saturday, the 17th, and had developed a fever that day (18th). When he saw her, her temperature was 105°. Examination revealed negative physical findings except drum of right ear was red and inflamed but not bulging. She then began to run an irregular fever from 98.6° to 99° in morning, with chill and temperature from 103° to 105° in evening, going up to 106° on 22d. On 23rd, drum was bulging and paracentesis was performed by Dr. E. R. Miller. There was only a slight amount of thick drainage. After this, her temperature did not go above 103° until 27th when it reached 105° again. At this time she was seen by another physician and given calomel and laxatives with no result on temperature. She developed an acute rheumatic arthritis of right ankle joint April 1. I saw her in consultation April 2, physical findings were negative except rheumatic joint, as stated above, and a bulging right ear drum, with old incision healed except for a small opening at top of incision which was plugged with thick pus; temperature then was going to 105° in p. m. Some days she would have two chills with highest rise in temperature after second chill. Dr. Miller opened the drum on April 3, obtaining a thick plug of pus, at which time the child's condition looked desperate. After this, temperature did not go above 103°. On the 6th, Dr. Wine and I noticed what appeared to be a furuncle about inner one-third of the external auditory canal, and on April 8 we expressed quite a bit of pus out of the furuncle. When we first saw the furuncle there was a red line running from it to the drum which was quite apparent on the 8th. After this was opened and drained, her temperature never went above 100° and she only had chilly feeling but no real chill. By the 11th, she was free from fever, and discharge had stopped. From that time, she made an uneventful recovery. At no time did she have pain in the ear except for the one night at begining, and this subsided before morning. This child was very septic and for several days we feared a fatal ending. The very interesting thing in her case was the very thick pus which would not drain from the opening in the drum and its burrowing under the skin, presenting itself as an apparent furuncle in the canal.

I will not go into detail as to pus in the urine, or what is called pyelitis, as much has been written and talked about it in the past few years. I only take it up to draw your attention to it again as a very frequent source of

unexplained fever in children. The fever is usually of a fluctuating type, and the child appears during an acute attack much more ill than the physical examination will account for. One symptom I do want to bring out, and that is the color of the child. If you will notice these cases carefully, you will find they often have a peculiar pearly-gray color. Another thing to remember is that a single negative urine examination is not sufficient to exclude pyelitis, for pus may be absent from the urine one day and the next day or a few days after pus may come down in showers.

Let us remember that acute otitis media can occur without pain and that no physical examination in a child is complete without looking at the throat and ears and, in an unexplained febrile condition or in a child who is apathetic and not doing well without a definite reason, be sure to examine the urine.

I fully realize this paper has nothing of scientific interest, but, dealing with two very common conditions met with in children, if it will gain closer observation from any one along this line, I feel it has been worth presenting.

Discussion

Dr. Kenneth Bradford, Staunton: The lesson brought out in this paper cannot be over estimated. It is very important to every practitioner. Even the title itself is a lesson: it convicts us of sins of omission. These diseases are common. The other lesson is that, as they are commonly overlooked, it behooves us to bear them in mind when general examination shows no cause for the temperature, especially during the dentition period and after and during any acute infection. In case of pyelitis, it is well to bear in mind the fact that it often occurs in connection with gastro-intestinal infections, especially infectious diarrhoeas. Another important point is that in a case of infectious diarrhoea, if the diapers are not properly disinfected, they will very likely infect the patient through the urethra and give rise to a case of pyelitis. It is so common as to be axiomatic that when you have fever in a young child with no apparent cause you usually have either otitis media, pyelitis, or pneumonia, the last of which can, of course, be differentiated very soon.

Dr. J. E. Lincoln, Lacey Spring: Could you state absolutely that the case had no previous evidence of scarlet fever?

Dr. Conrad: Yes.

Dr. C. P. Harshbarger, Port Republic: I feel that I want to say a few words in substantiation of what Dr. Conrad has said as to diagnosis of pyelitis in children, especially small children. I had a case last winter and called Dr. Conrad in consultation. It proved to be influenza with a tendency to pneumonia. After seeing it several times I found a temperature which I could not explain by the symptoms on auscultation and percussion. After the child was apparently well of the influenza, she was still sick with pyelitis. Until that time I had had difficulty in getting a specimen of urine. The first specimen showed pus and blood. Many of these children get sick, especially in cross roads country, and are all seen by the general practitioner. That is why it is important for us to make an early diagnosis.

A few years ago I was called to see a lady who had, as I thought, symptoms of appendicitis, tenderness at McBurney's point, high temperature, chill, and I made an error in diagnosing this case. The symptoms were so prominent that it looked like operation. I called in Dr. Deyerle. After going very thoroughly into the case he found pyelitis.

Soon after that I was called to see a child with very moderate symptoms, not definite as to exact cause. The child was three years old. It turned out to be a clear case of pyelitis.

In my early years of practice I overlooked many cases of pyelitis. Now there are very few that I overlook on account of experience. A few months ago I was called to see a patient, and as soon as I saw her in this attack I suspected pyelitis. She had had a spell exactly like this in the winter and a prominent physician had said that she had appendicitis. I got a specimen of urine and found that it was loaded with pus. There was pain over McBurney's point, which was the symptom in the winter. She had pain over the urethra and over the back at this time. A few days after that she came up for life insurance examination. The symptoms had then subsided, but the specimen was still loaded with pus. There was another case in which the physician had made the same mistake of diagnosing appendicitis.

We cannot lay too much importance on the urinary examination in all cases of little children with temperature without apparent cause.

Dr. H. G. Middlekauff, Weyers Cave: A family of five children had influenza about the middle of January. Apparently all got well. In May, one child became sick and I saw it with a high temperature, no other symptom. The ears showed nothing. I gave castor oil and the next day he was well. A couple of days later another child did the same thing. The parents gave calomel and he got well without my seeing him. Another child did the same thing. In a few more days the baby got sick. The only way this child complained was just to lie still all day. (It had been a very active baby). If you lifted it up it did not raise its head. No diagnosis had been made in the other children. This child had peculiar symptoms, and the family was alarmed. The first day I saw it the ears were apparently normal. The child just presented the symptoms of lassitude and slight temperature. The next day the ear drums showed redness, and there was some slight glandular enlargement of the neck. With local treatment it cleared up. In a few days he presented the same symptoms again, but cleared up readily. He has apparently recovered.

All these cases go to prove that there may be otitis media without pain.

Dr. Conrad, *closing*: I have noticed this year with small children a rather large tendency to pyelitis after influenza, in which they continue to have an unaccountable temperature.

AN UNUSUAL ACCIDENT DURING DELIVERY AT TERM.

Report of a Case.*

By B. H. MARTIN, M. D.,
and
ARTHUR S. BRINKLEY, M. D.,
Richmond, Va.

NAME: Mrs. C. A. N.; white female; age 24; married. Occupation, housewife.

PAST HISTORY: Usual diseases of childhood; operated on for appendicitis five years ago, otherwise negative.

FAMILY HISTORY: Negative for cancer; one sister died of tuberculosis.

MENSTRUAL HISTORY: Menstruation started at 14 years of age; always regular; duration four to five days, with normal flow. Last menses February 15, 1922.

MARITAL HISTORY: Married 1915; three pregnancies before this one, all boys, fully developed, and delivery normal, now living and well; no miscarriages. Husband's health excellent.

GENITO-URINARY: No unusual vaginal discharge; no venereal sores; some nocturia during pregnancies, has to get up once or twice during night, no pain on urination.

CARDIO-RESPIRATORY: Negative except complained of difficulty in breathing on admission to hospital; pulse rate 90; volume fair.

GASTRO-INTESTINAL: Appetite good; constipation occasionally, otherwise negative.

PRESENT ILLNESSS The patient menstruated last on February 15, 1922. She had been seen at regular intervals during parturition by Dr. Martin. Nothing unusual was noted—apparently normal pregnancy. She started in labor about ten A. M., November 8, 1922—occasional pains. She was seen by Dr. Martin at noon; he made an examination, and thought very probably it was a breech presentation. Dilatation of cervix at this time was about two inches in diameter—occasional pains. He left the patient in charge of an attendant and returned early in the evening, intending to give chloroform and deliver her. On a second examination he found that he was dealing with a face presentation. The cervix was fully dilated, and labor pains were about five minutes apart. At 9:45 P. M. she was given a little chloroform by inhalation, and five minims of pituitrin by hypodermic. She had a very severe pain soon after administration of pituitrin. and several slight pains for the next thirty or forty minutes. There was a moderate flow of dark blood coming from the vagina. Finding that the oncoming head had made no advancement, he washed up to do a version. The chin seemed to be locked behind the pubis. On introducing the hand, he found the baby was out of the uterine cavity, and his hand was in the abdomen. A version was quickly done, and a dead child delivered. Very little bleeding followed delivery. The hand was introduced again, and this time it entered the uterine cavity, and the placenta was easily delivered. On further examination he found that the vaginal vault was almost completely torn away from its attachment to cervix, only a small bridge of tissue holding posteriorly. He packed the vagina with sterile gauze, and called Dr. Brinkley over the 'phone. At this time, 10:40 P. M., the patient was lying quietly in bed, and, with the exception of being a little pale, showed no evidence of shock or severe hemorrhage—pulse 80 to 85, and very good volume. She, however, complained of rather severe pain in both iliac regions, radiating in her hips, and down her thighs; also some difficulty in breathing when deep inspirations were taken. With sterile vaginal retractors, the vagina was inspected to see how much bleeding there was, and also to get a better idea of the condition we were dealing with. There was a good deal of oozing from the torn surfaces, so the vagina was packed tightly with sterile gauze, and the patient sent to The Retreat Hospital in an ambulance, and operated on immediately by Dr. Brinkley.

Under gas, oxygen, ether anesthesia, an incision was made for pelvic work, extending from the umbilicus to the pubis, and about one inch to the right of the median line. On opening the peritoneal cavity, a small amount of free blood was revealed, and also some large clots in the torn part of both broad ligaments. The uterus was well contracted, and there was no evidence of a rupture in the uterus. The clots and free blood were quickly removed, and the uterus was found to be suspended only by the tubes on either side and a small bridge of the vaginal attachment posteriorly, which was about one and a half inches wide. Both broad ligaments were lacerated up to the pelvic brim on either side, and the tear on the right side extended through the vaginal wall

*Read at a meeting of the Richmond Surgical Society, February 6, 1923.

practically to the vulva. The uterine arteries were as cleanly dissected out as if some one had done a careful dissection, but were not torn away from the uterus at the main point of entry. They were pulsing, and the small branches had stopped bleeding. The uterines were quickly clamped and severed between the clamps. The left tube and ovary were markedly injured, and the blood supply practically cut off, so it was thought best to remove the left tube and ovary with the uterus. The broad ligament on this side was doubly clamped and severed between the clamps. The right tube and ovary seemed to have a pretty good blood supply, so they were not removed. The broad ligament and tube were doubly clamped close to the fundus of the uterus, and severed between. The only attachment left was the small bridge of tissue at the posterior cervico-vaginal junction. This was clamped off, and the entire uterus, with left tube and ovary attached, was removed. The vagina was then repaired, starting at the lowest angle, and suturing it over with a whipped suture of No. 1 tanned catgut. The uterine arteries were then doubly ligated; the ovarian arteries were doubly ligated, and the vagina was then closed with a purse-string suture of No. 1 tanned catgut, reinforced with several interrupted mattress sutures of the same material. A cigarette drain was inserted in the vagina before the purse-string suture was tied; the stump of the right broad ligament and tube was fixed to the vaginal vault for support. The peritoneal reflection of the bladder, which had been torn away from the anterior surface of the uterus, was then used to help cover over the raw surface. Both broad ligaments were whipped over, and all the raw surface was completely covered with peritoneum. The cul-de-sac was then carefully sponged out with saline sheets, and about three quarts of normal saline poured into the abdominal cavity. The appendix had been removed at a previous operation.

The wound was then closed in the following manner: A continuous mattress suture of No. 1 tanned catgut in the peritoneum; a lock suture of the same in the muscle; a lock suture of the same in the fascia, reinforced with six interrupted mattress sutures of the same material. Eight silkwormgut interrupted sutures were then inserted in the skin to include the fascia, and the ends were clamped to be tied later. The skin was then closed with a mattress suture of No. 1 tanned catgut. The silkwormgut sutures were tied over a roll of iodoform gauze, and a sterile dressing and bandage were applied. A retention catheter was then inserted, in order that the bladder could not become distended with urine. The patient left the table in fair shape; pulse around 120, and volume fair, considering the amount of blood she had lost.

Post Operative Orders: Flat in bed; hypodermoclysis 500 c.c. stat., and 50 c.c. q. 4 h.; continuous rectal saline, glucose, and soda, gravity method—saline pts. 1, glucose oz. 1, soda drs. 2; caffein-sodio-benzoate grs. 2, q. 6 h. hypo.; digalen min. 15 hypo. Q. 6 h., alternating so as to get stimulation every three hours; morphine grs. 1/6 q. 4 h. S. O. S.; water freely.

Gross Pathology: The specimen consists of an uterus about the size of a small infant's head, with left tube and ovary attached. It is well contracted, and there is no tear in the uterine wall or in the cervix. The uterus is now incised to see if there is any pathology on the inside. The interior of the uterus is clean, with no evidence of placenta or membranes. There is no laceration in the uterine wall.

November 9th, second day after operation, the patient had a fair night only, complained of air hunger at times; pulse good; volume ranging from 112, just after returning from operating room, down to 88 at 8:00 o'clock A. M.; temperature 100; respiration 22; moderate amount of drainage from vagina, tinged with blood. Blood count: Reds 2,696,000, whites 15,000, polys 85%, lymphocytes 15%, hemoglobin 55%. Urinalysis: Color, amber; turbidity, very cloudy; reaction, acid; specific gravity, 1032; albumen, large trace; acetone, slight trace; blood corpuscles, few; pus cells, occasional; crystals, abundant amorphous urates; casts, few hyaline and rare granular; epithelia, few.

November 10th, third day after operation, uncomfortable night, complained of severe pain at times in lower abdomen and hips, moderate amount of distention, highest temperature 101.4, pulse 96, respiration 24, taking water freely and expelling gas back in proctoclysis can. Sherman's vaccine No. 35 was ordered, starting with ½ c.c. hypo. first day, increasing to 1 c.c. daily. Mammary glands were very tense and painful; belladonna ointment and bandage applied; wound inspected, healing

nicely; liquids, except milk, every 2 hours ordered.

November 12th, fifth day after operation, patient had a fairly comfortable night; temperature went to 102 during night, pulse 100, respiration 24; expelling a large quantity of gas and feces through proctoclysis can; moderate quantity of thick, bloody looking vaginal discharge, excreting a fair quantity of urine; nauseated once or twice during night, and vomited a little light green fluid early in A. M. She was given a pint of hot soda water; it was vomited back immediately, and she felt better. Two hours later compound licorice powder drs. 3 was given, followed in four hours with S. S. enema, which returned clear. Two hours later she had a very large dark brown stool. Bowels moved three times after this, abdomen soft, and patient fairly comfortable. Proctoclysis discontinued. Blood count: Whites 16,000, polys 90, lymphocytes 10, hemoglobin 60. Urinalysis: Color, orange; turbidity, hazy; reaction, acid; specific gravity, 1025; albumen, large trace; acetone, heavy trace; blood corpuscles, few; pus cells, numerous; crystals, triple phosphate; casts, negative; sediment, moderate amount. Bicarbonate of soda, dr. 1, t.i.d., and sweetened drinks q. 2 h., were ordered.

November 14th, seventh day after operation, patient had a rather uncomfortable night; complained of severe pain at times in lower abdomen; scanty vaginal drainage; highest temperature 100, pulse 92, respiration 22. Later on in the day the cigarette drain in the vagina was loosened up; this was followed by a marked increase in vaginal drainage, with small pieces of sloughing tissue. Feeling very much better; wound dressed, healing nicely; modified soft diet ordered.

November 16th, ninth day after operation, had a very comfortable night. Later on in the day she began to have an uncomfortable feeling in the region of the bladder. Catheter removed, and found to be stopped up with sediment; another inserted, and about 18 oz. of urine drawn off, and bladder irrigated with warm boric acid solution, and two drs. of 10% argyrol injected. Catheter removed and patient voided normally during day; very comfortable after catheter was removed. Highest temperature 99.4, pulse 96, respiration 20; moderate amount of serous vaginal discharge; blood urea, 25 mg. per 100 c.c.; urea nitrogen, 12.5 mg. per 100 c.c.; Wassermann, negative. Urinalysis: Color, straw; turbidity, very cloudy; reaction, strongly alkaline; specific gravity, 1020; albumen, trace; acetone and diacetic acid, negative; blood corpuscles, occasional; pus corpuscles, occasional; crystals, few triple phosphate; casts, negative; sediment, large amount. Acid sodium phosphate grs. 10 with urotropin grs. 7½ in large glass of water was ordered given every four hours. Bicarbonate of soda discontinued.

November 20th, thirteenth day after operation, patient has been very comfortable for past few days. Temperature has been normal since November 16th; pulse today 88. Expelled cigarette drain from vagina; small amount of vaginal dscharge. Wound dressed, no evidence of infection; healing nicely.

November 23rd, sixteenth day after operation, the patient has been doing well. Normal temperature, pulse 90. Sutures removed, no evidence of infection. A little straw colored serum cozed out of one of the stitch holes about middle of the wound; very little vaginal drainage. Blood count: Reds 2,976,000, hemoglobin 50, whites 7,000, polys 80, lymphocytes 20. A urinalysis showed the following: Color, amber; reaction, acid; specific gravity, 1020; albumen, trace; acetone and diacetic acid, negative; casts, negative; blood and pus corpuscles, a few; sediment, slight.

The patient had an uneventful recovery from now on. Allowed to sit up on November 30th, twenty-third day after operation, and left for home December 4th, twenty-seven days after operation, feeling very good. January 9th, 1923, the patient reported for examination. The abdominal wound had healed by primary union. With a bivalve vaginal speculum the vault of the vagina was inspected and found entirely healed. She was looking well and had no complaint.

REPORT OF UNUSUAL CASE OF MASTOIDITIS.*

By L. LEROY JONES, M. D., Portsmouth, Va.

Irving M., aged 5 years, had been suffering with acute sore throat, before I saw him on January 28th, in consultation with Dr. E. H. Claud. There was no previous medical history that had any particular bearing on his

*Read before the Virginia Society of Oto-Laryngology and Ophthalmology, in Richmond, April 18, 1923.

present illness other than an earache and rising in the left ear, one year ago. Examination of his ears at this time, showed the left ear normal and slight redness and bulging of the right ear drum. An opening of the ear drum was advised. The parents having been told that the child's tonsils and adenoids should be removed, desired that a general anaesthetic be given and all three be done at the same time, as they did not want the child hurt. After a thorough physical examination it was decided there was no contraindication to this procedure, so patient was taken to the hospital and given ether, tonsils and adenoids removed, and a wide and deep myringotomy performed. There were no complications. The patient was taken home the following day, ear discharging freely, and no pain.

Patient was seen in my office two days later, his condition being exceedingly satisfactory, with the usual amount of discharge from his ear that we ordinarily see from acute otitis media. There was no pain or temperature. The patient continued to be perfectly comfortable; but when he returned to my office on the eighth day after his operation there was a slight purulent discharge from his ear, with very little tenderness over the tip and antrum on deep pressure. There was no sagging on the posterior wall of the canal. An X-ray was advised and taken of the mastoid at this time, which showed the following: Both right and left sides showed marked density and cloudiness throughout the process with complete loss of cell definition. No portion of either process appeared pneumatic. It appeared to be a chronic sclerotic process on both sides, with possibly some active infection.

The child having had a history of similiar infection in the opposite ear one year previous, and the X-ray showing apparently the same pathology in both, I did not advise operation, but observation and local treatment. Patient was seen by me daily in my office for another week, at which time the ear had ceased to discharge and the drum appeared normal; hearing normal. No discomfort, no temperature or evidence of ill health.

On March 3rd the patient was sent to me from Dr. Claud's office with the following history: No discharge from the ear or any sign or symptom of ill health, other than a slight cold, since he was last seen by me. Child had been playing around the house as usual and for the first time a swelling behind the right ear was noticed this morning. An examination of the patient's ears revealed the following: Left ear, negative; right ear, no discharge; drum appeared normal; no sagging of the posterior wall of the canal. Behind the ear there was a swelling and tenderness over the entire mastoid area, and looked as if there might be pus in a small area directly over the antrum. I advised that the child be taken to the hospital for mastoid operation. Ether was given and, on exploring the mastoid, it was observed that the whole mastoid area was of a purplish color and appeared to be spongy and necrosed. There were two small eroded areas about 1 cm. in diameter, one being over the tip and the other over the antrum. From this area I began to scoop out with the curette necrosed bone, pus and granulation tissue. No chiseling was necessary. The mastoid cavity proved to be totally destroyed. The destruction and the copious amount of pus and granulation tissue reached up to the dura, which was exposed over an area adjacent to the upper portion of the tympanic ring. The dura appeared to be thickened and hard. The sinus was exposed to the extent of 1½ inches and found to be literally swimming in pus and granulation. The wall of the sinus was hard and indurated, pale blue in color. Pulsation could not be detected. The simple mastoid operation having been practically completed, and comtemplating opening the sinus to determine definitely whether or not there was a thrombosis, also contemplating a jugular operation, I was informed by my anaesthetist and the family physician that the patient seemed to be in very poor condition, for further operative measures, and it was thought wise, both by Dr. Claud and myself to defer the opening of the lateral sinus for 24 hours. So the wound was closed with one stitch, with a rubber tube drainage and a light gauze packing. The pathological findings were explained in detail to the parents, immediately after the operation, and also the fact that other operative measures of a more serious nature would probably have to be resorted to the following day, the prognosis being probably unfavorable. The following day, March 4th, the patient's temperature remained normal and, when seen by me, was sitting up in bed playing with toys and with the exception

of a temperature of 99.3 on the third day after operation, which an enema relieved, his temperature remained normal. He was discharged, entirely well, on the sixth day of April, without ever having his lateral sinus operated upon.

The case is of unusual interest to me, in that we have here an extensive and total infection of the right mastoid, including a perisinus and epidural abscess and lateral sinus thrombosis, with such an atypical history—no pain, temperature or discomfort, either before or after operation. There was no discharge from the ear for over two weeks before the operation, during which time the child appeared perfectly well in every detail, and during which time very extensive destructive changes were taking place. How can any organism be virulent enough to give these destructive changes and at the same time not be virulent enough to give any other symptoms, such as elevation of temperature and some evidence of discomfort, or at least, ill health. I think that this patient unquestionably had a thrombosed lateral sinus, because on inspection the walls appeared diseased and thickened and on palpation the vessel was hard and no pulsation could be detected. The infection being of a low virulence, the thrombosis became organized and the collateral circulation became established sufficiently to take care of the obstruction.

This case was a lesson to me, in that we should be extremely cautious in our prognosis, even when most extensive pathological changes are found. The parents of this child were led to believe by me that the child was seriously ill and at the same time there was no evidence of it as far as their observation was concerned, either before or after the operation.

Professional Building.

INSULIN TREATMENT OF DIABETES.*

By J. D. WILLIS, M. D., Roanoke, Va.

The discovery of an effective extract of the internal secretion of the pancreas by Dr. F. G. Banting and collaborators, at the University of Toronto, has proven to be an epoch-making event in the diabetic world.

Dr. Banting first conceived the idea of preparing a potent extract from the atrophied pancreas while assisting in physiology at the Western University Medical College, London. He came to Toronto and, by arrangement with those in charge of the Department of Physiology of the University of Toronto, began, May 17, 1921, an attempt to obtain the pancreatic extract by a new procedure.

His first work was done in collaboration with C. H. Best and conducted in the Department of Physiology at the University of Toronto under the direction of Professor J. J. R. MacLeod. He also received the aid and support of Professor V. E. Henderson of the Department of Pharmacology, on whose staff Banting held an appointment. The clinical application was made with the assistance of W. R. Campbell and A. A. Fletcher, in the clinic of Professor Duncan Graham in the Toronto General Hospital and in other institutions. Through the support of the Connaught Laboratories, under the direction of Professor J. G. Fitzgerald and Professor R. DeFries, facilities were obtained for the first small production of insulin, for clinical trials, prepared by a method elaborated by C. H. Best and J. B. Collip. The basis for this work was the appreciation by Banting that, upon ligation of the pancreatic ducts, there develop degenerative changes in the acini of the pancreas but not in the islet tissue. This observation was taken advantage of in the preparation of an active extract of islet tissue. Further experiments proved that trypsinogen and its derivatives were antagonistic to the internal secretion of the pancreas, and the failures of other investigators were thus accounted for.

The first pancreatic extract used by these investigators was obtained from the atrophied pancreas of the dog after the pancreatic ducts had been ligated for a period of ten weeks. The atrophied pancreas immediately upon removal was extracted in ice-cold Ringer's solution and then purified. It was found that this extract injected into diabetic dogs invariably reduced the percentage of sugar in the blood and in the urine.

Next, taking advantage of an observation that no enzymes were found in the fetal calf pancreas until after the fifth month, the pancreas from fetal calves was extracted in Ringer's solution and, after purification, injected into diabetic dogs, causing definite reduction in blood and urinary sugar.

Finally, a potent extract of islet tissue was obtained from adult beeves' pancreas by ab-

*Read at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

stracting with 95% alcohol immediately after the death of the animal. The resin-like residue obtained by this process was re-dissolved in saline and injected subcutaneously into a diabetic dog, with the result that the percentage of blood sugar fell from .35 to .08 in three hours, and the urine became sugar-free. This was repeated with similar results. An extract, which could be kept sterile, had thus been obtained from the whole gland of the adult beef. The administration of this extract prolonged the life of totally depancreatized dogs from 19 to 70 days.

The next step in experimentation was the use of a potent, soluble, protein-free extract of the adult beef pancreas in the treatment of seven cases of diabetes mellitus. It was found that, in the human cases, following injection of insulin, there was a fall in blood sugar and a rise in respiratory quotient, indicating carbohydrate utilization. Patients reported complete relief from the subjective symptoms of the disease. By continuing injections of the extract the blood sugar would become normal if the dosage was adequate and ketonuria was abolished.

As a tentative basis for the physiological assay of insulin one unit is considered as the amount necessary to cause the blood sugar of normal rabbits weighing one kilogram to fall to .045% within four hours. This dose is decidedly active in lowering blood sugar in diabetic patients and is estimated to make possible the patient's utilization of one to four grams of carboyhydrates.

Insulin now available for treatment is in strengths of five, ten and twenty units per cc. The remarkable lowering of blood sugar by insulin makes it necessary that extreme caution be taken in its administration. Generally speaking it is best to give insulin fifteen to thirty minutes before a meal, either once, twice or three times daily, according to the severity of the disease. Frequent blood sugar estimations must be made, in order to intelligently control the dosage. There is great danger in reducing the blood sugar below the low normal of .08%. The outward manifestations of lowered blood sugar below normal are weakness, nervousness and sweating. At this stage immediate consumption of sugar in the form of oranges, corn syrup, or candy affords ready relief. If the reduction in blood sugar should be as low as .045%, there will develop a state of coma and convulsions. Glucose solution intravenously is necessary should such a serious state develop.

Insulin is an adjunct to the dietary treatment of diabetes, and the success in this treatment is largely dependent upon the intelligence and cooperation of the patient in carrying out dietetic instructions. A minimum supporting diet, low in carbohydrates, should be taken as a diet basis to work from. When the blood sugar of the patient reaches normal limits there should be a gradual increase in diet up to the caloric requirements of the individual. The well-known Joslin outline of diet is well adapted to this increase.

The insulin dosage will have to be increased or decreased, as determined by blood sugar estimations. It is desirable to use as little insulin as possible after the blood sugar has reached normal. It is possible in many cases to discontinue insulin very soon after blood sugar becomes normal. A sudden drop in blood sugar from a rather high concentration to normal is often seen. This is a dangerous period because of the likelihood of carrying the reduction below normal. This sudden drop in blood sugar is believed to indicate the resumption of function of the islet tissue of the pancreas, either wholly or in part. Stengall states that there is just as much reason to believe that a sick pancreas may recover by rest as a sick kidney.

Today I wish to give you my experience with five cases treated with insulin.

"Mrs. R. K. B." Age 35. Known to have had diabetes for the past two years. Weight: Two years ago, 165; one year ago, when I first saw her, 117. At that time she showed 2.22% sugar in 24-hour specimen of urine, with a trace of acetone and diacetic acid. She entered the Shenandoah Hospital and was treated for two weeks by the Joslin dietetic method. At the end of two weeks she was discharged on a diet consisting of 85 grams carbohydrates, 50 grams proteins, and 85 grams fat, totalling 1,300 calories per day. This diet was sufficient to maintain her weight at about 110 pounds, sugar-free except for an occasional spill-over.

At the time of starting insulin treatment, February 27, 1923, her weight was 106¾. Twenty-four-hour urine specimen showed 3½% sugar, and there was a good trace of acetone and diacetic acid. Blood sugar was

.23%. She was put on approximately a 1,000 calory diet consisting of 40 grams carbohydrates, 30 grams proteins, and 80 grams fats. She was given five units of insulin hypodermatically 15 minutes before each meal for two days. It was then increased to ten units before each meal. The fourth day the blood sugar reached .16%, and on the ninth day it reached .11%. At this time the urine sugar was a mere trace, and on the eleventh day there was no sugar in the urine and the blood sugar was .08%. She had gained two pounds in weight. She was discharged at the end of two weeks with a diet of 1,200 calories and had gained from 106¾ to 109. Two weeks later her weight was 115; urine sugar-free; blood sugar .07%.

This patient was entirely relieved of all subjective symptoms and was able to resume her normal activities, which she had been unable to do for two years. At the present time she is holding her weight around 115, sugar-free, on a calory diet of 1,500. She is now taking ten units of insulin before breakfast and before supper.

"Mr. J. W. D." Age 66. Has known that he had diabetes for the past two years. Complained of excessive thirst and polyuria. He ate ravenously, would drink four glasses of fluids during the meal, and get up soon to drink more. He averaged getting up once each hour at night to void. His blood sugar was .26% and urine sugar 6½%.

Insulin treatment started March 6th; ten units 15 minutes before each meal. Diet consisted of carbohydrates 40 grams, proteins 30 grams, fats 85 grams. Calories 1,000. The second day after starting treatment the excessive thirst was relieved, he voided three times at night, and within three days' time he said he felt like a different individual. All the depression and other subjective symptoms of the disease had disappeared. At the end of one week the blood sugar was .08% and urine sugar negative. He was discharged from the hospital on the eighth day, his weight 214 pounds.

Insulin was continued with this man, ten units before breakfast and before supper for one week. At the end of this time the blood sugar was .07% and urine sugar negative. Ten units of insulin were continued before breakfast for another week and at that time the blood sugar was .08% and urine sugar negative. His weight remained 214. At this time the insulin was discontinued and diet continued which provided 1,800 calories, consisting of carbohydrates 60 grams, proteins 80 grams, fats 130 grams.

He has continued up to the present time on this diet and has retained his weight with no increase in blood sugar above normal, no return of glycosuria, and no return of the subjective symptoms.

"Mrs. A. O. S." Age 39. Weight 72 pounds. This patient had moderate thirst and an acetone odor to the breath. Blood sugar .21%. Sugar in the urine 8½%. She was known to have had diabetes for the past two years. Insulin treatment started March 20th. She was given 15 units 15 minutes before each meal and a 1,000 calory diet consisting of carbohydrates 40 grams, proteins 30 grams, and fats 80 grams. On the eighth day the blood sugar reached .06% and the urine sugar was negative. She was discharged from the hospital at the end of two weeks and had gained six pounds. She has continued the insulin and now takes ten units before breakfast and before supper. She now weighs 86 pounds. All subjective symptoms of the disease have disappeared.

"Mr. S. B. C." Age 63. Was brought in as an emergency with shortness of breath, which was thought to be a state of acidosis. He had had a large carbuncle on the back of neck for one week. Upon examination it was found that he had a badly decompensated heart, and the shortness of breath was largely resulting from this complication. The blood sugar was .32% and urine sugar 4%. This man was given 15 units of insulin every three hours for three doses, then every six hours. He died thirty hours after being brought to the hospital from myocardial decompensation of the heart. At no time did he develop a tendency to coma. This patient had had diabetes for the past seven years.

"Mr. J. A. S." Aged 70. Rather emaciated. Was in a state of extreme drowsiness at the time I saw him in consultation. By the time he could be transported to the Shenandoah Hospital he was more comatose and soon become decidedly comatose. Blood sugar was .30% and urine sugar 7%. He was given 15 units of insulin every two hours for four doses then every six hours. At the end of 12 hours there was decided clearing of mentality.

By the second day all signs of coma had disappeared. There developed a profuse expectoration of slate colored offensive material, which was evidence of a gangrenous lung area. By the third day the blood sugar was .08% and urine sugar negative. He was by this time on a 600 calory diet consisting of 10 grams of carbohydrates, 60 grams of proteins, and 40 grams of fats. Patient continued to improve with lessened expectoration. On the sixth day he suddenly died with what was thought to be cerebral embolus.

A FEW POINTS ABOUT THE ACUTE ABDOMEN.*

By W. DENNIS KENDIG, M. D., Kenbridge, Va.

The diagnosis of the diseases of the abdomen presents many difficulties. Those of a subacute or chronic nature are easier of diagnosis because there is sufficient time to make an exhaustive examination. Acute conditions of the abdomen may demand immediate attention, and for this reason the course of treatment should be early determined upon. The first step is to make a diagnosis. If a diagnosis is made, then the nature of the disease will determine what is best to be done. Some cases, however, on account of indefinite diagnostic symptoms and lack of time, baffle the most astute diagnostician. Such cases, in many instances, while not presenting a definite diagnostic picture, show positive signs of some serious acute condition within the abdomen. This has been called the acute abdomen.

The examination of such cases includes a painstaking history, a careful physical examination, a complete urinalysis, a full blood count, and such other diagnostic procedure as may be indicated and the circumstances will permit.

The most important symptom is pain. At times pain may be so characteristic in its location, severity, and character that the nature of treatment can be determined on this one point alone. Pain is the physician's and surgeon's greatest aid in bringing the case to operation. In the absence of pain it is hard at times for the laity to appreciate the importance of operation, even when recommended by competent men. I wish to advise against the early use of morphia in these cases, especially before a diagnosis is made, unless absolutely necessary. It interferes with the diagnosis and sometimes causes a delay in getting patient's consent to surgical treatment. It is needless for me to say in acute abdominal pain never to give cathartics, but use enemas. An abdominal pain, not relieved by an enema, or certainly an enema and washing out of stomach, is generally a surgical case, and needs careful watching. In the examination of a case, the facial expression is very important, as sometimes the record sheets may show that probably the patient is improving, yet there is about him that unexplainable expression that indicates he is fatally sick. This has been called the "peritoneal face." Other important general symptoms are posture, character of pulse, fever, tumors, abdominal distention, tenderness, rigidity, condition of the skin, nausea, constipation, or diarrhoea, vomiting and hemorrhage.

The diseases which may cause the acute abdomen are appendicitis, acute cholecystitis, perforated gastric or duodenal ulcer, acute intestinal obstruction, ectopic pregnancy, strangulated hernia, acute salpingitis, acute pancreatitis, mesenteric thrombosis, and twisted pedicle of an ovarian cyst. Appendicitis as the causative factor is indicated by general abdominal pain, which localizes in the right iliac region, nausea or vomiting following pain, and abdominal sensitiveness. The temperature is elevated slightly during first twenty-four hours, then higher, quickened pulse, and increased leukocyte count.

Acute cholecystitis as the causative factor is indicated by pain in the right upper quadrant, fever early, localized tenderness over gall bladder, and rigidity of right rectus. It is hard at times to differentiate this from acute appendicitis, as the pain may be referred to the right iliac region or the appendix may be high, or the gall bladder lower. Then too, they both may exist at the same time.

Perforated gastric or duodenal ulcer as the causative factor is indicated by sudden onset of continued upper abdominal pain and nausea simultaneous in onset, subnormal temperature, weak pulse, cold wet skin, shallow and painful breathing, anxious countenance, flat rigid abdomen, and sometimes history of indigestion, "gas and hunger pain."

Acute intestinal obstruction as the causative factor is indicated by obstinate constipation, vomiting, paroxysmal pain, with gurgling and

*Read at meeting of Southside Virginia Medical Association in Petersburg, March 13, 1923.

exaggerated peristalsis and progressive distention of abdomen. Temperature, etc., are later.

Ectopic pregnancy as the causative factor is indicated by sudden onset with regular and colicky pains, sometimes very few but excruciating, and localized more to one side; no fever, decidua, history of irregular periods, mass to one side of uterus, hemorrhage and shock much greater than visible loss of blood.

Appendicitis, cholecystitis, perforated gastric or duodenal ulcer, acute intestinal obstruction and ectopic pregnancy usually are the cause of a large per cent of cases of the acute abdomen, although the other causes mentioned are the causative factor occasionally. The patient, at the first time he is seen, may no longer be suffering from the original lesion, but from its effect, such as peritonitis, following perforation, hemorrhage of an ectopic pregnancy, gangrene, or toxemia from a strangulated hernia.

After making a diagnosis or determining the so-called acute abdomen, the main question is what is best to do. If seen early, operate immediately, but if seen later and the patient shows signs of progressive peritonitis developing, with the distended "silent" abdomen, rapid thready pulse, persistent vomiting, and mental acuteness, it is much safer to resort to the conservative treatment, or the Ochsner-Murphy method. In this way many times the patient is carried through who would have succumbed to operation. Operation can then be done later when thought best. Bottomley advises in early cases of peritonitis to operate at once, but in later cases to institute the Ochsner-Murphy treatment and start an hourly or half-hourly pulse chart. A pulse that shows a steady rise in rate at the end of two or three hours demands operation immediately, but a steady falling pulse rate shows that the infection is being overcome and operation may be safely postponed.

To illustrate the foregoing remarks, I wish briefly to report a few cases. Only the positive findings are given.

Case No. 476. Age 24, white, housewife. Referred to hospital Sunday, June 25, 1922, 4:45 P. M. When first admitted, patient had a temperature of 102, pulse 120, very thready. She gave a history of a pain in the stomach starting three days previously, which had localized in abdomen. At this time patient was very much collapsed, heart sounds were weak and irregular, abdomen slightly distended, and had board-like rigidity. She was immediately given 700 c.c. saline by vein, and heart stimulants. This revived her considerably. Leukocyte count at this time was 16,000; diagnosis, acute abdomen, and, from history, of appendiceal origin. Patient's abdomen was opened 6 P. M. of the same day. Right rectus incision. Ruptured gangrenous appendix was found, free pus in abdomen abundantly. Pus was aspirated with suction pump. Appendix tied off, not invaginated, and drains inserted. Patient's condition did not change during operation; no stimulation was given. After two more intravenous injections of saline at 6 hour intervals patient's recovery was uneventful.

Case No. 582. Age 35, white, housewife, multipara. *History of present complaint*—Patient felt perfectly well when retiring the night of February 23, 1923. About three A. M., February 24, she was awakened with a severe pain in the abdomen; some nausea, no vomiting, pain remained about the same day of the 24th; she was admitted to hospital at 9 P. M., February 24th. At this time patient was rather collapsed, pulse rate 100, but weak, skin and mucous membranes pale. Pain was relieved somewhat with morphia administered previous to moving to hospital. Slight murmur was heard with systole over the mitral area. Abdomen was distended, and slightly rigid, felt spongy to palpation, and indefinite spongy mass could be made out on the right side. Blood examination showed 3,000,000 reds, 10,000 whites, and 60% hemoglobin. From the physical findings, the blood picture and a history of irregular menses, a diagnosis of acute abdomen caused by ectopic pregnancy with internal hemorrhage was made. There was no bleeding from the uterus. Abdomen was opened 4:30 A. M., February 25, 1923; right rectus incision: free blood gushed out of the abdominal cavity, when opened. The bleeding point was found to be a ruptured right tube. Blood clots were cleaned out of the abdomen, the tube removed and abdomen closed with no drainage. Patient is still in hospital and making an uneventful recovery.

Case No. 379. Age 12, colored. Referred to hospital August 2, 1922, 5 P. M., and gave the following history before admission. Was taken ill five days ago with a pain in stomach; two days later pain localized over appendix,

and remained there 24 hours; since then pain has been over entire abdomen. On admission the abdomen was so rigid that no pathology could be made out. Pulse rate 104, rather weak, temperature 99; leukocyte count 9,000. With so much rigidity, the significant history, and the low blood count indicated a grave prognosis as the reaction of the body was not good. Diagnosis acute abdomen. At operation the same day a gangrenous appendix was found, free pus in abdomen, and a general peritonitis. Appendix was tied off, drains inserted, and abdomen closed. Patient died at 1:40 the next morning. This patient, we think, would probably have done better with conservative treatment or Ochsner-Murphy method.

Case No. 579. Male, age 28, white, laborer. *Previous history*—Ten years ago patient was shot in abdomen with shotgun. Abdomen was opened at this time and some blood removed but no perforation of the intestines was found. Several weeks after this operation was done, abdomen was opened again for what he called "locked" bowels, and six inches of ileum was removed. During the past six or eight years patient has been bothered with constipation, and pain in abdomen. At one time he was in the hospital, and was told that he had adhesions. *Present complaint*—Patient went to work as usual, about 10 A. M. Was taken with a pain in the stomach and had to go home. There was no result from cathartics taken that night. Next day, Tuesday, his condition was worse, with pain in stomach and abdomen, and physician was called. The following day the patient was brought to hospital, at which time he was in severe pain, temperature 100, pulse 106, respiration 24, and was vomiting a green fluid almost constantly, and had to be catheterized. Pulse was weak, abdomen very rigid and slightly distended. Leuckocyte count was 31,000. Diagnosis acute abdomen. Abdomen was opened at 6 P. M. same day; right rectus incision; intestines were ballooned with gas, and gangrenous from strangulation and abdominal cavity was filled with a thin watery pus. Long section of the small intestines was made, including the adjoining parts of jejunum and, ileum being gangrenous, were removed, and cut ends were sutured together by an end-to-end anastomosis. Peritoneal cavity was washed out thoroughly with normal saline, drains inserted and abdomen closed. Patient's condition was very bad at this time; pulse barely palpable, rate 149. Patient was put on heart stimulants, and morphia, gr. 1/6, every four hours; saline by vein every eight hours for three days; stomach washed out every six hours for several days. Vomiting continued for four days after operation and was relieved only by lavage. At present there is no drainage from abdomen. Patient is eating general diet. Patient is still in hospital and doing satisfactorily.

After all is said and done, the causative diagnosis of the acute abdomen is at times very difficult and sometimes impossible, but the crux of the situation is this: when in doubt, act, and act promptly and intelligently. A clean abdominal section made under proper conditions will do no harm. Neglect to act promptly will often cost the life of the patient.

DUTIES AND ADVANTAGES OF THE "WHOLE-TIME" COUNTY HEALTH OFFICER.*

By P. M. CHICHESTER, M. D., Leesburg, Va.
Health Officer, Loudoun County, Virginia.

In taking up a subject of this nature, I am not blind to the fact that it is not a subject usually discussed before practitioners. As a rule, a considerable gap exists between the State health authorities and the general practitioner. Doctors who have followed public health or preventive medicine as a specialty should be placed on the programs of the various societies more often, so that a close cooperation and feeling of good will may exist. It is a special branch of medicine and should be treated as such. Since my experience began, I have had the existence of this gap too frequently brought to my attention not to be aware of it. This difference, I know, is not without some foundation. There are two outstanding facts, which I believe are responsible for the existence of this feeling:

First, a lack of sympathy for and understanding of the general practitioner by the health authorities. This is not true of all health authorities.

Second, the great tension under which the physician works at all times, and a lack of knowledge of the health laws along with a lack of knowledge of some of the things which are so essential to the thorough working of a health department. This also is not true in every case. To lessen this gap, the "preventive specialist" should more frequently take part

*Read before the Medical Society of Northern Virginia, Maryland and District of Columbia, near Norbek, Md., May, 16, 1923.

in these meetings for the purpose of each becoming more familiar one with the other.

The man whose entire efforts have been spent in technical public health knows little of the difficulties of the physician in general practice. He knows a certain law exists and he knows a physician is supposed to comply with this law. I feel fairly safe in saying that I suspect a large majority of the physicians present have had, at some time or another during their practice, a communication from the health authorities, which has been considered uncalled for and possibly a little harsh. If you will recall, however, these letters are graded—that is to say—a first one to remind, and that followed by one more to the point, and this second letter usually comes as a result of previous trouble along the same lines. As a rule, this is the only means the health officer has of transmitting a certain health principle to the physicians. We have to admit that they, both physicians and the State boards of health, are somewhat out of touch with each other. The State health authorities are not always to blame, nor are the physicians. There must be a closer contact. Little can be accomplished by a correspondence school. The physicians cannot learn public health in that way, nor can the health authorities learn the difficulties of the practice of medicine. Preventive medicine or public health is just as much a branch of medicine for a specialist as pediatrics or surgery.

The health commissioners with whom I have had experience are all men of the highest professional type; but the work is so vast that they can only act in a supervisory way and the detailed work must be left to many subordinates, a great many of whom, through necessity are learning public health and can be readily classified as lacking, to a degree, in sympathy and understanding, but it must be so. There are men of inexperience on the public health side so far as the practice of medicine is concerned, as well as men of inexperience among the physicians so far as the public health is concerned. You cannot expect the high type of efficiency in the man who is using the position as a "stepping-stone." When he reaches a certain state of efficiency he steps on to the next class, because the salary is not sufficient to hold him and cannot be made sufficient. In comparison to its value to the people there is less available money for public health or preventive medicine than any other public institution. As I have said before, this state of affairs is not entirely to be placed at the door of the departments of health. Some of the physicians in some instances, I am sorry to say, thoroughly justify a strained situation between themselves and the public health servants. Often this strained situation is unavoidable, sometimes neglect and occasionally indifference. I am not accusing the medical profession, of course. I only have in mind certain instances which have occurred in my experience.

Tact and experience are necessary, on the part of the health officer, in handling all such situations. I am sorry to say this essential is sometimes lacking. The physician cannot be expected to know all the "ins and out" which are absolutely essential for good public health work. He must have experience. In the medical profession, like any other, experience is the best teacher. I should say this is particularly true of medicine. So true is it that no man will impose himself upon the public now-a-days, without first serving an interneship in a good hospital. After he gets this preliminary experience, he then begins practicing. Along with this practice he becomes acquainted with his health department at long range. His health department only asks co-operation and requires compliance with the laws, but the practitioner, occasionally, looks upon the health department as an abstract organization which only annoys him concerning reports and vital statistics.

Along with his practice the practioner gains more and more experience in medicine, and more and more knowledge of the workings of his health department, but it is a slow process, as I have said, through a correspondence course. His time is full, all of it. He probably never sees any of the representatives of his health department. Practically the only point of contact is through the mails. This is very unsatisfactory as we all know.

Practically all the time the physician isn't spending in looking after his practice, he is reading medical literature, attending meetings, taking special courses,—in every way making himself better fitted to relieve human suffering. It is a noble idea, a noble thought, a noble calling. His mind and efforts are concentrated on the ill individual and in making every effort to relieve him. It is no wonder he does not know much about the health department. Particularly so long as Public

Health is not made a course in each medical school he should be able to talk in person with his health officer and tell him his troubles (for he surely has them). It isn't right for him to have to take his course at long range. Every community of a cetrain population should have a trained and practical man to look after its disease prevention.

Compliance with the law is a duty which is imposed upon us all, no matter what profession we follow, whether we be preachers of the gospel, lawyers or physicians. Because of the importance of health, there are a great many laws pertaining to it, and the physician is at times put to it pretty hard to comply to the letter. There should be a local health officer to aid him in every way possible.

I say the general practice of medicine is a wonderful, noble, Godlike profession. But, what of the men or group of men who are working equally as hard along almost the same lines, only applying their efforts to the public instead of the individual, and who are attending meetings, reading literature and taking special courses for the purpose of becoming as efficient as possible in preventing a good deal of suffering the practitioner is relieving?

Relief of suffering, and cure if possible, are essential and the individual sees that, and sometimes willingly pays for it—occasionally very dearly. He is supposed to pay directly for it. (He doesn't always, however.) He pays indirectly, through his taxes, for his preventive physician. He should have this servant close at hand where he can call on him directly and quickly, and feel sure that the health officer has a personal feeling for his particular case. He cannot see the results so well. When he is enjoying good health it may be on account of good milk, water, food or sanitary surroundings or an inoculation or vaccination, or all of these factors combined which are responsible for his happy state, or it may be due to health education received at some period of his existence. I say again, he should have his trained man at hand all the time to look after these things so vital to his health and happiness. As it is, his mind reverts to his last spell of illness and to the physician, who (to use his pet expression) "Pulled me through." He gives all the credit to his physician (where a great deal does belong), and to himself, when as a matter of fact a portion of the credit should be given the health officer, who should always be at his side armed with good health laws and personally equipped with knowledge which make it possible for him to live happily and in good health. Could any profession be more noble?

Now, gentlemen, after explaining the situation as I have found it, and having brought out some of the advantages of the whole-time county health officer and some of the difficulties which must be overcome, I want to state to you in a brief way what I consiter the duties of a "whole-time" county health officer, and to show further the advantages to the county and the physicians in having such an officer.

Certain health laws exist, and are necessary and reasonable. The fact that they exist makes it our bounden duty to comply with them. The fact that they are necessary and reasonable makes this duty easier.

At first glance, one would say that the health officer is working in opposition to the physicians. Is that true? No one would dare say that the physicians are working in opposition to the health officer. This would be equivalent to treason. But if they do not co-operate, and neglect and shirk their duties, they are working against the health officer, whose work stands for health and happiness in the community. I know it is the desire of every true physician to join in all the work for the public good.

Good public health work will eliminate a certain very objectionable class of work from the physician's practice. What true physician, these days, will not give up that portion of his practice on such diseases as diphtheria, typhoid and kindred maladies? The chances of unavoidable accidents are too great in such troubles for him to want them. What physician is not ready and willing to turn over (all but the treatment) to his health officer any of his communicable diseases, thereby relieving himself of the responsibility of the quarantine and the control of such diseases? In the country he cannot do this unless he has a whole-time health officer. To aid the practitioner in this way is a very decided duty of a health officer.

The whole-time county health officer fills in the gap between the State authorities and the county. He is the connecting link. He is constantly in touch with local affairs. He knows the local authorities and local needs. General principles are necessary, but each community has to have special modifications of these general principles. It is the health officer's duty

to apply these principles to the best advantage, always bearing in mind the local conditions.

Bearing the foregoing statements in mind, the whole-time health officer's duties are clearly cut out. We can place them under four heads:

First. His duty to the State.
Second. To the public.
Third. To the physicians.
Fourth. To the individual.

There is no special significance in the order named. His duties to each are equally binding.

His duty to the State is simple. He should be acquainted with the State health laws, and see that these laws are carried out. He must be tactful and in every way possible obtain results before resorting to force by law. He must keep the community under his jurisdiction in close touch with the unit head. To work conscientiously at all times.

His duty to the public is to see that his community enjoys the benefits of good health which are obtainable through close co-operation with the local physicians, and through educational propaganda; to see that each preventable disease is so isolated as to safeguard the surrounding public; to advocate vaccinations and inoculations of various kinds to protect the public; to call out all the resources possible from State and other sources to aid as far as possible in producing a state of good health in his community. He must bear the responsibility of the general health in his section. Burdens should be placed upon him which he must bear or he should get out for the next man.

His duty to the physicians is important and requires great tact. He must always bear in mind that the physicians and schools are the foundation of his disease control work; that he must say and do nothing that will in any way influence the feeling or opinion of a particular patient towards his physician, except to encourage confidence in the family doctor. The health officer must maintain the closest friendship with the physicians and, last but not least, he should prepare himself so that he can be of assistance to the physicians in clearing up difficult and doubtful diagnoses of the communicable diseases. The physician should feel that he is calling in a good, free diagnostician. In other words, he should be somewhat of a specialist in the communicable diseases, particularly from a diagnostic standpoint. A physician, who has primarily the individual in mind, hates to put them to any unnecessary inconvenience; so the health officer should be such a man that the physicians can call on him without fear of any rash statements or action. None of us knows it all. We are all human and therefore, subject to error, but as I have said, experience counts for a great deal, and the health officer should have had experience in the diagnosing and control of communicable diseases, so that the general practitioner, who sees comparatively few such diseases, can call freely on his health officer.

The health officer's duty to the individual is simple, but nevertheless important. He should always consider the individual's feelings—making the burden of quarantine and all other burdens as light as possible, but always safe for the other man. He should lead the individual by education and persuasion rather than force.

A health officer should have two main qualities—leadership and technical ability. Of the two, possibly leadership is the more essential. He can gather about him, if needs be, skilled workers, but he must be able to lead these workers.

The whole-time county health officer comes nearer giving the rural practitioner the same advantages that the city practitioner enjoys than anything else. Every physician should be an advocate of good health. Our training calls for it. We take the "oath" when we graduate. With a health officer at his disposal, a physician can relieve his mind of the details of any situation pertaining to public health, if he will only report these conditions to his health officer as he comes across them in his practice.

To summarize: let me say that the county health officer has decided duties to the State, to the public, to the physicians and to the individual.

He gives to the State, to the public, to the physicians and to the individual his skill and time. He is due from the State, public, physicians and individuals a hearty co-operation. Without this co-operation he is compelled, at times, to resort to force, and his work is greatly handicapped.

He probably adds to the physician's practice because in his various investigations the health officer is constantly referring to family physicians people who would probably never have come to the doctor until too late. He asks in return that the physicians comply with the

law. That is reasonable, I think. The health laws of the State are our guide—they are essential and reasonable. I think a man should be thoroughly acquainted with these laws before he takes up medicine, and if he doesn't like them and doesn't pledge himself to comply with them he should choose another profession. He is dealing with too precious a commodity—life. It is the health officer's duty to see that they are carried out, and it is the individual's duty to carry them out. There is no law which, at times, does not work apparent hardship on some people. If we disobey or disregard the law, whether that law be of man or God, we are punished. It may be a slow process and it may be a slight one, but it is sure. I often feel like calling the laws pertaining to health "The laws of nature" or "The laws of God."

Anyone who objects to or disregards the principles of the health officer necessarily objects to the principles of the clergyman and the pedagogist. They are working for the three essentials of human happiness—a sound soul, a sound body and a sound mind. There can be no real happiness without a sound body. The straightest way, however narrow it may be, to this happy state of existence, is through *prevention*. The health officer works along these lines.

TREATMENT OF PULMONARY TUBERCULOSIS.*

By H. R. EDWARDS, M. D., Richmond, Va.

The chief factor in the treatment of tuberculosis, whether in a sanatorium or in the home, is REST, and this means rest of both mind and body. It is not enough to rest the body, if we allow the mind to be excited, for there is just as great and sometimes greater loss of energy by mental drain than by physical exertion. Physical rest is obtained by rest in bed or in a reclining chair in the open air, the details of which have to be altered to suit the individual cases and surroundings. Mental rest is a most important step in the treatment. Phthisiophobia is a condition present in more or less of the patients treated, and one of our first steps should be to reassure the patient and gain his confidence, explain to him that the process is a long one at best, but if followed methodically there is no reason to believe that he cannot regain his lost health. This of course does not apply to the advanced case and those who we believe will not be able to respond to the treatment, but to the earlier cases or those with advanced disease yet who take care. There is nothing gained by not telling the patient the absolute truth, and explaining to him the various steps to be taken and why they must be taken. The only cases in which there is any excuse for not telling the truth are those of children below the age of understanding and others so far advanced that there is no hope for them. In both of these cases the parents or those responsible should be told, and they should be made to feel responsible for the proper carrying out of precautions.

Next in importance to rest is fresh air. The patient should live in this day and night. Fresh air may be warm or cold the same as stale air; proper ventilation, sleeping porches, window tents, roof tents, or bungalows, are advisable; if they cannot be had, there is always the possibility of opening windows. In outdoor sleeping the patient should be protected from draughts or exposure to rain and wind.

No less essential is proper diet. It is a most important part of the treatment of tuberculosis and will require considerable thought, especially for the bedridden case. The details of this phase will be taken up a little later.

SANATORIUM TREATMENT

The purpose of the sanatorium is to give the patients an intensive demonstration of the method of taking the cure. It offers systematic regimen and supervision, the most salient factor in the treatment of the disease. The usual sanatorium, unless making a speciality of the advanced cases, is best suited to the earlier cases or to those who are showing good resistance. That is to say, a case according to physical examination may be in a moderately advanced or a far advanced stage of the disease, yet ambulatory and able to react should he be permitted to take intensive rest and treatment. Much depends upon the morale in a sanatorium; if there are mixed cases the frequent deaths are discouraging to the others, and not only to them but they discourage the other early cases at the places from which those patients came. Most cases look alike to the laity; and a death at a

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15, to April 15, 1923.

sanatorium scares them so terribly that they will not go there for treatment.

For those of a suitable type for sanatorium treatment, it would be far better to have them in a sanatorium for a few months, chiefly to learn how to take care of themselves. Eventually, they must resort to home treatment, and it is far easier in the beginning of the treatment to learn how to conduct it with others in the same condition than to learn alone.

The sanatorium teaches the danger signs, how to take exercise, and when to stop. It further gives the patient some training in occupational therapy, and in many instances patients engaged in harmful occupations before their entry to the sanatorium are able to master a new source of income before they leave. This is very important, for what is the good of arresting a case and then allowing it to go back to the same old conditions, which means in short time another break down with an advanced condition and a consequent prolonged intensive treatment?

Home Treatment

Eventually all sanatorium cases must resort to this type of treatment, and 95% of our active cases are taking it from various reasons. Sanatorium facilities are not adeqoate, finances interfere, and various other causes.

The fact that so many thousands of cases do improve and even cure themselves at home is ample reason to assure us that it is a perfectly feasible plan and can be done, that while it may be a little more difficult yet it is possible. Ideal treatment would be expensive; but, while we hold up an ideal to strive for, it is quite evident that all will not reach it. Still they can come as near as possible; and in this emergency the physician will be required to use his ingenuity constantly.

A few general considerations should suffice for a guide to the proper method of approaching this phase of the treatment. The patient should have seperate quarters, that is he should sleep alone. The preferable place for his room and porch, if it is possible, would be a southern or eastern exposure, adequately protected from the elements, yet giving him the maximum amount of sunshine and fresh air throughout the year. If there is a pleasant scenic view, that should be taken advantage of. Often a room to the rear of the house is better than on the front, for then the patient is not so constantly exposed to the passer-by. While active, that is maintaining a temperature of 99.5° or over, he should be in bed; after the acute activity has subsided for a few days to two weeks, he may be allowed to sit in a reclining chair in the open air. If it is not possible to have a sleeping porch, it is practically always possible to have some sort of a window tent arrangement whereby a patient can be in the fresh air day and night—the windows can always be opened. While in bed, use the minimum amount of bed clothing that is required to maintain body warmth. Remember that much depends upon the protection from beneath as to how warm the patient will be.

Separate dishes should be used, and they should be washed thoroughly immediately after every meal, in hot soap suds and water and finally rinsed in boiling water. When the case becomes closed, if this precaution will be pursued religiously, there will be no danger in using the dishes with the rest of the family.

Avoid hangings and draperies in the sick room as well as carpets; there should be nothing there but what can be easily cleaned or boiled.

Climatic Treatment

Much in the past has been attributed to climate, and no doubt change of scenery and surroundings will have beneficial effects, but we have found that under proper living conditions we have been able to effect cures quite as well in the lower as in the higher altitudes, though the latter are, of course, more stimulating than the lower ones. There is a certain type of advanced case that does better in high altitudes than in lower; but usually when an advanced case has been treated in an extremely high altitude he would better stay there than attempt to return to a lower one. Here in Virginia the small variation in altitudes is not marked enough to make any material difference. The chief thing about climate is to get a plenty of pure fresh air with the maximum amount of sunshine and of days which the patient may spend out-of-doors.

Exercise

This is one of the most abused methods in our treatment, and one very simple if given the proper thought. I have many times told patients able to take exercise of say an hour twice a day that they could do anything they

wished provided they did not tire themselves. This of course would not include piano moving, mountain climbing, and strenuous exercises as tennis, baseball, etc. Many patients have suffered relapses days to weeks after some indiscretion in exercise. Hemoptysis often can be traced to over indulgence at some previous time.

Exercise should not be attempted until the patient has had a normal temperature for at least two weeks, and then only gradually, by walking the first day not more than 15 minutes morning and afternoon. Walking should be slow and on the level, if there is a slight grade take that in the first half of the walk, so that the return can take advantage of the down grade. It should be regular; the same amount each day. That is, suppose a case has 15 minutes b. i. d. and he wishes to save this up for a several hours' trip at the end of the week, he will invariably do himself damage. Regularity and systematic endeavor is the only way to attempt it. In case the temperature should be increased or there should be coughing, expectoration, or definite fatigue or dyspnoea from which the patient does not recover within an hour or less after his return, he should stop exercise. If his weight does not remain constant, but he loses gradually or his appetite does not remain as before he started it, he should take the rest again, and at each time begin all over again.

Exercise can be graduated from 15 minutes b. i. d. for the first week, increasing it 15 minutes if the case is able to stand it without any unfavorable symptoms each succeeding week until he is able to do two hours b. i. d. Even with this amount taken in the open air, many cases will show fatigue when returning to their former occupations.

Occupational therapy, as weaving, basketry, reed work, and metallurgy is ideal; croquet is perhaps the best game to play. Some sort of occupation should be encouraged wherever possible, for it makes the patient more interested, improves his general morale, and avoids the invalidism so disastrous to many.

Special Treatments

Artificial Pneumothorax is a very valuable procedure in the treatment of certain types of cases; it should not be used, however, until the other more common means at our hand have been exhausted and then only with the consultation of another physician.

Its indications are in those cases with a unilateral lesion to begin with. There are occasionally cases with a slight amount of healed tissue on the good side that are able to take gas, but it should be slight indeed. Hemoptysis that will not respond to any other method; cases showing a rapid spread of disease on one side, when all precautions as to rest, etc., have been tried faithfully; or those who have observed the "cure" for a long period, yet show active toxaemia without necessarily a spread of the disease, are its chief indications. The X-ray should be used in all these conditions before giving gas, if possible, as a diagnostic aid.

The idea in artificial pneumothorax is to put at rest more completely the diseased lung. Once started it often must be continued for months, though it is possible to decompress the lung and have healing continue. It is a method of resort only when the more simple methods fail, and then after careful consultation, X-ray, etc.

Its technic is too large a subject to enter into here.

Violet Ray is usually given in the mercury vapor lamps, the vapor being developed in quartz tubes; it is an artificial sunlight from which the irritating red rays have been removed and the healing violet or blue rays maintained. It is questioned by many, and lauded by as many more. In my own experience I have seen actual improvement in the following types of cases, glandular, intestinal, throat, bone and joint cases, and this seems to be the impression in general. In lung cases it is not so good, though as a psychic factor it may help. I have seen many cases with slight pulmonary lesions improve remarkably with violet ray treatment, but I doubt its value except from a psychic viewpoint. The mechanism of its action is not definitely known. Some strain the fact of the pigmentation caused, and some various other factors. We really understand it but little, yet it is evident that some types of cases are benefited.

Heliotherapy.—Sunlight in moderation and under supervision is a great factor in the same types of cases as mentioned above; more has been done with it in Europe than here, especially among the children and those with glandular and bone disease. Exposure should

be graduated in dosage and over small parts of the body at first, and never if streaks or fever appear.

Deep Therapy X-ray.—Its use is new and enough evidence has not been accumulated thus far to recommend its use as a general agent.

Dietetic.—Volumes could be written on diet but I will only mention the salient factors here. It should be nutritious and include rich milk, eggs, fish, fowl, meats in moderation, especially to those in bed, grains, fresh vegetables, fruits. High protein dietaries increase the burden on the kidneys and other eliminative organs, increase metabolism with an increase in respiration and on the whole should be restricted as much as possible. Alcoholics are never necessary. Meals should be regular t. i. d., except for those who are below weight, and if it does not affect their appetite at meals, provided they are showing a gradual gain in weight, broth, milk, eggnog, cocoa, and the like may be given between meals and before retiring at night.

The guide as to the amount to feed should be the weight chart; regular weighing on the same scales with the same clothing should be practiced. A slow gain in weight is much better than a rapid gain. It is essential that the patient regain the weight that was normal before his illness began and perhaps a few pounds (5-10) over, before he can feel that his weight is not a factor to be given special attention. Flabby flesh is injurious, the gain in weight should be associated with the gain in strength, and the hard firm flesh is the kind that will stay.

Special Remedies

Among the most common remedies used are cod liver oil, dram 1, t. i. d., creosote, ggts. 15-20 to tolerance and then reduce to 5-6 gtts., guaiacol carbonate, especially good in cases with wheezing, hypophosphites, arsenic, iodoform, etc. Most of these remedies have their place, but that place is not near as important as it was once considered to be, and it is always best to avoid their use as much as possible if the case can be induced to observe proper rest and other precautions. There is always danger of upsetting digestion.

Tuberculin has been much touted and in a limited number of cases is still capable of some good. It is best administered in a sanatorium under constant observation. The supply should be fresh and renewed often; it is not a method to be used by the average practitioner. Its benefit is theoretically due to the stimulative action it is supposed to have on scar tissue formation. It is given in logarithmic doses infinitesimally small, and gradually increased over long periods of time, keeping just below the point of reaction. It is always used in conjunction with rest, fresh air, and proper diet, and it is often a question just which factor should receive the most credit.

Treatment of Special Symptoms

Cough.—First determine the cause; if catarrhal or nasal, treat accordingly. Cough syrups are irritating and to be avoided. Inhalation of tincture of benzoin with carbolic acid; formalin; or creosote, alcohol and chloroform, equal parts, is good. A morning cough on rising often responds to hot water and soda bicarbonate. Those due to throat coughs are helped by cocaine solution if severe, or bland gargles in the milder cases. Pleuritic cough responds to counterirritants, iodin, and in severe cases to morphia, which should be used only as a last resort. Pleurisy jackets, and strapping help. Heroin 1/6—1/2 gr. is used but is not a practical permanent relief. Stimulative expectorants as ammonium chloride gr. 3-5, or infusion of wild cherry are helpful. Avoid dust, smoke, and tobacco. Rest does more permanent good than anything else.

Fever.—If temperature is 99.5° or above, the bed is the only place, drugs should be avoided as long as possible; in a few cases some drugs as acetanilid gr. 2-3; phenacetin gr. 3-5 may be used; the cause is increased absorption of toxin and the best way to minimize this is to put the patient at absolute rest and keep him there for two weeks after the temperature has returned to normal. This helps to prevent the liberation of toxin.

Night Sweats.—Use alcohol sponges, sponges of alcohol and tincture belladonna, and avoid drinking large amount of liquids at night. Atropine, gr. 1/120—1/60, sulphuric acid 1% solution, agaricin, gr. 1/8—1/4, are accepted medicinal remedies.

Gastro Intestinal.—Regulate diet, correct constipation and use all simple methods before trying drugs; they only, as a rule, relieve symptoms and do not strike at the cause of the complaint. Vomiting in the morning or after coughing is controlled with cerium oxa-

late quite easily, gr. 8, an hour before the expected attack, as they often come at quite regular intervals.

As diarrhoea will be considered under complications, I will say no more now than that alum, whey, and broths are beneficial. Bismuth, acetate of lead and opium, thymol, salol and benzo-naphthol, are recognized remedies.

Hemoptysis.—A fair percentage of tuberculous cases have blood-spitting in some amount during the course of their disease; when it is small they do not become as alarmed as when it amounts to ounces. Coming so often in the early morning hours it is distressing indeed, for there is the sensation that it may not stop and the prospect of gradually bleeding to death causes a great deal of mental unrest. The pulse rate and tension are increased, which consequently tends to prolong the bleeding if not to increase it. So the first thing we must do is to reassure the patient if possible, gain his confidence and help him to believe that it will not amount to much and, if he can calm himself, it will be all right. This is not easy to do and is only possible if the patient has confidence in his physician.

If the blood-spitting is in the form of "streaks" only, carefully examine the condition of the gums, or other conditions in the mouth, nose, or throat that might be responsible. If it is susupicioned or definitely known to come from the lungs, the patient should be cautioned to observe more rigid rest, avoid all exertion or sudden expenditure of energy, and go to bed until it has ceased, and further to remain there for from five to seven days after. Many times this will avert a more serious hemorrhage. An examination should not include the expiratory cough for rales, as auscultation for ordinary breathing is sufficient. If there is a rise in temperature, the more necessary is it for the patient to be put to bed, for this indicates either a spread in disease or the absorption of toxin into the blood stream. Patients on exercise should stop until the streaking is over for a week, and then on returning to it make it gradual, though perhaps not over as long a period as in the beginning. Limit the amount of hot liquids especially, and give no stimulating foods. Iced drinks are best for a day or so, and they should be restricted. Bits of ice in the mouth are best for thirst.

Should these streaks become frequent, that is throughout the day, or even develop into frank hemoptysis of a dram or more at one expectoration, the patient should be put to bed absolutely and kept there for from one to two weeks after the bleeding has ceased or longer, depending upon the amount and the condition of the case. In those with large hemoptysis, reassurance of the patient is the first step. They should be put in a semi-reclining position, usually about 30° is the most favorable, an ice cap applied to the chest, and suitable basins provided for expectoration, which will not require the patient to exert any effort. When the amount is in ounces, a hypodermic of morphine should be administered. Never attempt any examination, except auscultation on ordinary respiration, and that is to be done with caution. Heat to the extremities, and bits of ice for patient to hold in the mouth should be given. Coagulin and serum is often good and, if the hemorrhage is not too large, will help to control it. Pearls of amyl nitrite, hypodermic injections of nitroglycerine, gr. 1/100, may be used to lower blood pressure. Atropine sulphate, gr. 1/100 to 1/50, often helps to check a hemorrhage. The numerous serums on the market have a place in the checking of hemorrhage. It is well to familiarize one self with them and use selected ones in conjunction with the above measures. Ergotol is used by some but is dangerous as there is always a secondary relaxation of the vascular system which may result in an even greater hemorrhage. The diet should be reduced to dry stuffs, no hot liquids or stimulating foods at all. The food is best given in form of toast, or crackers and cold milk. Some cases of small hemorrhage can be relieved by bits of salt in the mouth.

When the bleeding does not respond to the above, or there is a single large hemorrhage of say a pint or more at one time, with continued bleeding following it, and if the patient is known to have definite involvement of one side and it is determined that the blood is coming from this side, artificial pneumothorax should be considered, and not delayed more than a day if the foregoing means have failed to check the process. It may be necessary to continue the gas treatment for some time, as there is often great danger of repeated bleeding as soon as the decompression reaches a certain point.

Any patient with hemoptysis of one ounce or more at any one time should not be allowed to exercise or be out for a minimum of one week to ten days, and this time increased in length as the amount of bleeding is increased. The healing process in the lung where there is a constant movement is more difficult than on the exterior of the body where we can apply pressure and ligation to control bleeding.

In conclusion, let us recapitulate by putting the greatest emphasis on absolute rest during the clinically active stage of the disease, the maximum of pure fresh air and proper diet, the prophylactic treatment of all those exposed to tuberculosis to prevent new cases, exercise or vocations to be resumed under precaution always. Emphasis on the fact that sanatoria are for the most part educational centers best suited to the earlier cases. It is possible to conduct the "cure" at home, provided we have the co-operation of the patient, a prerequisite to the successful treatment of any case.

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SIGNIFICANCE OF A PROLONGED COAGULATION TIME OF THE BLOOD.*

By J. S. HORSLEY, Jr., M. D., Richmond, Va.

Prolonged coagulation time of the blood is either in itself pathological or an accompaniment of a pathological condition. The diseases in which pathological hemorrhages most frequently occur are hemophilia, chronic jaundice, purpura, and melena neonatorum. Purpura itself is really a symptom and not a disease and may occur with hempohilia.

The theory of the coagulation of blood most universally accepted in America is that of Howell, of Johns Hopkins. This theory in his own words is as follows: "In the circulating blood we find as constant constituents fibrinogen, prothrombin, calcium salts, and antithrombin. The last named substance holds the prothrombin in combination and thus prevents its conversion or activation to thrombin. When blood is shed, the disintegration of the corpuscles (platelets) furnishes material (thromboplastin) which combines with the antithrombin," and at the same time liberates more "prothrombin: the latter is then activated by the calcium and acts on the fibrinogen," forming fibrin which is the foundation or basis of the blood clot. Thus,

Antithrombin antagonistic to prothrombin:

Thromboplastin + antithrombin frees prothrombin:

Prothrombin + calcium = thrombin:

Thrombin + fibrinogen = fibrin.

An abnormality in any of these four fundamental constituents of the phenomenon of coagulation will correspondingly alter the blood clotting time.

Howell and Holt described two new substances, in 1918, which are connected with the process of coagulation of blood: I. A phosphatid, designated as heparin, which is obtained most readily from the liver (dog). It possesses two characteristic reactions, (1) it retards or prevents coagulation of blood, both in the body and when blood is shed; (2) it causes a marked increase in antithrombin when added to blood or serum. II. Pro-antithrombin, an antecedent or mother substance for antithrombin is present in plasma and serum in considerable quantities and is converted promptly to antithrombin by heparin. Heparin inhibits clotting mainly by preventing the activation of prothrombin to thrombin. It acts as an antiprothrombin rather than as an antithrombin. Theoretically it is suggested that heparin and prothrombin are normal constituents of the circulating blood (not demonstrated for heparin) and together fulfill the function of safe-guarding the fluidity of the blood; e. g., preventing intravenous clotting. When blood is shed or when in other ways thromboplastin (cephalin) is added to blood the protection afforded by the heparin is overcome and thrombin is formed in amount sufficient to cause clotting. It is suggested that variations in the amount of heparin in the blood may suffice to explain some of the known abnormalities in coagulation, hemophilia, for example.

An excessive amount of oxygen, the restriction of food, the ingestion of large quantities of water, smoking of tobacco, are said to delay coagulation time. The injection of certain chemicals, particularly the extract of the head of the leech, called "hirudin," retards clotting. The coagulability of blood is also prolonged by certain snake venoms and after poisoning with chloroform or prussic acid. The effect of hirudin and of snake venom is believed by

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Howell to be due to the antithrombin contained in these substances. According to Whipple an excess of antithrombin is responsible for a large number and great variety of clinical forms of delayed coagulation, such as occur in septicemia, pneumonia, endocarditis, miliary tuberculosis, general vascular thrombosis, etc.

Drinker and Drinker have found that, in cats and rabbits, rapid progressive hemorrhage causes a decrease in the coagulation time, with an occasional exception. This is accompanied by a decrease in the amount of antithrombin. The latter may be due to simple dilution of the blood by an influx of fluid from the tissues or to a decrease in the amount of antithrombin formed. Most of the fluid entering the blood after hemorrhage comes from the abdominal region. This fluid is, according to Drinker and Drinker, lymph, not tissue juices. Lymph contains prothrombin and antithrombin in the same concentration as blood plasma, but much less material which may produce thromboplastin. There is, therefore, a relative excess of antithrombin in lymph which explains its long coagulation time. Addition of thromboplastic material to lymph causes it to clot firmly and promptly. In experiments carried out by these authors they found that the prothrombin changes did not offer any explanation for the decrease in coagulation time which occurred. The fibrinogen, estimated by the heat coagulation method, decreased as the hemorrhage progressed. Antithrombin decreased in amount when the coagulation time decreased and remained practically constant when the coagulation was unchanged. Platelets did not vary with rapid progressive hemorrhage. The results seem to differ from those obtained by Hanzlik and Weidenthal, who state: "Results of four experiments performed by us showed the coagulation time to be invariably and markedly shortened as the hemorrhage progressed." They, however, worked on dogs; but this hardly seems to explain the wide discrepancy. Experimentally this point still remains unsettled.

As yet the whole subject of normal coagulation of blood is in a theoretical stage and that of the significance of abnormal clotting time is even more theoretical. This is a step in the direction of the real facts, whatever they may be; but the true value of these numerous factors must be judged by their confirmation by both experimental and clinical findings. Already some very practical points have been derived and applied successfully in the treatment of certain hemorrhagic diseases.

The cause of melena neonatorum is not definitely known, but it seems probable that it is not due to disease of the blood vessels themselves or to an infection, but is a congenital malformation of the blood, the exact nature of which is not known. Transfusion of whole blood is a specific treatment for this disease.

Prolonged coagulation is characteristic of true hemophilia. It also occurs in some forms of purpura of the secondary type, particularly in those in which the liver parenchyma is greatly damaged. Fibrinogen is produced in the liver and a deficiency of it is the probable immediate cause of the hemorrhagic tendency in certain diseases of the liver, such as acute yellow atrophy, cirrhosis of the liver, yellow fever, and in certain forms of poisoning, as phosphorus and chloroform. The coagulation of the blood is normal or only very slightly prolonged in all forms of idiopathic purpura (purpura hemorrhagica), and in most forms of secondary purpura, such as scurvy. In all these conditions it is likely that there is some defect in the formation of fibrin ferment.

Adis concludes that hemophilia is due to an inherited defect in the prothrombin, whereby it is less readily activated than normal. Sahli thinks the prolonged coagulability is due to a deficiency of thromboplastin and that this in turn comes from some defect both in the blood corpuscles and in the endothelial cells. Minot believes that the blood platelets in hemophilia are normal in quantity, but deficient in quality, probably lacking prothrombin. One of the most important methods of treating hemophilia is by serum therapy. It is the prothrombin in fresh serum that probably gives it its therapeutic value in checking hemorrhage.

The absence of the proper amount of calcium salts together with the somewhat obscure influence of such diseases as malaria, yellow fever, scurvy, jaundice, hemophilia, pernicious anemia, leukaemia, and alcoholism decrease the coaguability of the blood. Ottenberg and Lee suggest that the delayed coagulability in obstructive jaundice is due to the blood calcium entering into some sort of combination with the bile pigments.

At St. Elizabeth's Hospital we have ob-

tained very excellent results in the prevention of postoperative hemorrhage from cases of chronic obstructive jaundice by following the preoperative treatment suggested by Walters of the Mayo Clinic. Five c.c. of a 10% solution of calcium chloride in redistilled water are given intravenously, daily for three days, each time preceded by a determination of the coagulation time of the venous blood. If at the end of this time the clotting time has not been lowered to less than nine minutes, operation is postponed until such a reduction is obtained. Besides giving calcium chloride intravenously, large quantities of carbohydrates are given by mouth and glucose solution by proctoclysis, in order to increase the supply of glycogen to the tissues of the jaundiced patient. This is the food of choice for patients in toxic states as shown by Opie, and in cases of liver deficiency, as demonstrated by Mann. Large quantities of water by mouth increase the body fluids and help eliminate bile pigments.

In treating pathological hemorrhage, the main issue is to correct the cause of the prolonged clotting time. The exact cause is not always known, and when this occurs the following general measures should be resorted to: (1) Arrest of hemorrhage locally by surgical procedures, application of cephalin, blood platelet extracts or some of the other numerous similar preparations; (2) Attempt to correct the systemic cause of hemorrhage by whole blood transfusion, preferably given by the direct method. We get best results by using the silver cannula of Bernheim, connecting directly the radial artery of the donor with a vein of the forearm or elbow of the patient. The reactions that follow this are practically nil, and the blood elements are altered less than by any other method of transfusion, except direct union of the artery and vein by suture, which requires a good deal more skill and time. Transfusion not only furnishes the deficient blood constituents which promote a normal clotting time and stop the hemorrhage, but also replaces the lost blood. Carter and others have shown that the intravenous administration of citrated blood, which is very extensively used, will temporarily decrease coagulation time. Sodium citrate solution injected intravenously has a similar effect (Gerster). There are, however, two very good reasons why the citrate method of transfusion is inferior to the whole blood method. (1) The number of the platelets is greatly diminished and their character is altered considerably by the citrate method. In hemophilia the replacement of normal plaetelets is most important. (2) Reactions of varying degree and severity follow in about 50% of all citrate transfusions. This factor is negligible in transfusion of whole blood by the direct method.

Summary

1. The mechanism of both normal and abnormal coagulation of blood is still in a theoretical state.

2. From the few facts known already practical points in the treatment of hemorrhagic diseases have been successfully derived.

(a) Deficiency of fibrinogen in diseases of the liver.

(b) Deficiency in prothrombin and in the quality of the blood platelets in hemophilia.

(c) Deficiency of calcium salts, as in chronic obstructive jaundice.

3. Calcium deficiency may be treated successfully by intravenous injections of calcium chloride.

4. The general measures of treatment when the direct cause of prolonged coagulation is not known are:

(a) Arrest of hemorrhage locally by surgery, cephalin, etc.

(b) Correction of the systemic cause of hemorrhage by whole blood transfusion, preferably by the direct method.

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THE PROBLEMS OF RURAL COMMMUNITIES AS REGARDS PHYSICIANS.

By J. M. MILLER, M. D., Crockett, Va.

That rural communities have problems to solve in securing and holding competent physicians will, I think, be readily admitted by all who have given the matter any serious thought. We may, however, differ in opinion as to why it is that physicians hesitate to locate, and after locating, do not remain for any length of time, in country districts.

In my opinion, there are several reasons for this, two of which are of paramount importance to any physician who contemplates locating in the country, and several others whose importance will vary, depending upon the individual case.

The first reason we will consider, for the scarcity of country doctors, is one that will apply as well, though in less degree, to the towns and cities. Compared to the population in this country, there are fewer young men devoting themselves to the study of medicine today, than there were a few years ago. The reason for this is not difficult to find. The course of study is so long, and the cost so great, that many worthy young men, and women too, are barred from even commencing this study. The two years of preliminary college work, plus the four spent in the medical school, and, if he is to be well rounded, the one or two spent as an intern in some good hospital, consume from six to eight of the very best years of a man's life. The cost connected with this preparation will average probably one thousand dollars per year. Thus, the capable, intelligent young man with this capital can, by applying himself industriously and intelligently to business, have as much money at the end of the eight year period as the average country physician will have accumulated in a life time of arduous toil.

While money should not be, and in most of cases probably is not the sole factor, influencing us in choosing our work in life, still it is one of the things that must be considered.

In considering the reasons that apply exclusively to the scarcity of physicians in rural communities, I would mention, first, the absence of good roads. You, whose practice is altogether in the larger towns and cities, or in those rare country districts so fortunate as to be blessed with good roads, have no conception of the deplorable, damnable, condition of dirt roads, for three or four months in the year. They are either so muddy that a horse (for an automobile is not to be considered at this time) sinks almost, if not quite, to his knees, in old mother earth, at each step, or, if the weather is cold and the roads are frozen in this condition, they are as irregular as the surface of an angry porcupine's back, and the horse, if he is so fortunate as to stay on his feet, flounders from one eminence to a corresponding depression, almost wrenching his limbs from their sockets, to say nothing of the damage done to the small of the back and central nervous system of the rider. The means for successfully navigating, going over, or through these roads, as the case may be, has never yet been discovered, and probably never will be, so long as man remains the type of animal he is today. These roads in winter are the continual night-mare of the country doctor. The fear of being called to negotiate, by some means or other, some eight or ten miles of their uneven surface, is often his last conscious thought before dropping into a troubled sleep.

The next reason I would give for the scarcity of doctors in the country is the smaller scale of fees prevailing here. Instead of being smaller, I claim they should be larger in country than in city practice. One of the main factors considered in determining amount of compensation for our services is based upon amount of responsibility assumed by us in treating a case. The responsibility of a country doctor is much greater than that of his city brother. By reason of his isolation he must necessarily be more or less of a specialist in all that appertains to the practice of medicine. Of course, I do not mean that he must be a skilled specialist in all of these different branches of medicine but, if he is successful, he must know enough of each one to know when and where to refer his patients for proper special treatment when the necessity arises. You in the larger towns and cities, when you meet with a puzzling, perplexing case, can, in a few minutes, secure a competent consultant, but we in the country cannot do this; we must often bear the responsibility alone. Another reason, why we should receive greater remuneration for our services is, as has already been intimated, because of the greater difficulty we have in reaching our patients. The city man can reach his in ease and

*Read at the meeting of the Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

comfort, while we, often, reach ours with great difficulty and discomfort.

Among other reasons that could be mentioned why some physicians do not locate in the country is often the absence of proper school facilities, for their children, and high class educational entertainments for themselves and families. There are only 340 accredited high schools in the State of Virginia. Of course, most of these are in the towns and cities, leaving quite an inadequate number to be distributed amongst the various districts of the one hundred counties of the State. The physician with a large family, located in a community without good schools, cannot give his children the education often deserved, unless he has financial means other than that derived from his practice.

The physician and his family seldom have the opportunity of hearing an address or lecture, or seeing a play or picture that is truly worth while, without going to some town or city more or less remote from them. In the matter of moving pictures though, I believe we country people are to be congratulated on their absence. While some of them are, and no doubt at sometime most of them will be, of great educational value, they, as at present conducted, are probably conducive of more harm than good, and will continue to be, until purged of all such characters as "Fatty Arbuckle" and his kind.

So much for the problems confronting rural communities in securing and keeping physicians. What, of the solution of these problems? The first reason given for the scarcity of rural physicians is the comparative scarcity throughout the whole country. I am inclined to believe this the most difficult of solution of any of the problems mentioned. None of us, in order to secure more doctors, would, for a minute, be willing to lower our medical standards. We think too much of our beloved profession, to be willing to sacrifice quality, for quantity. Perhaps, until living conditions and traveling facilities are much improved in the country, thus inducing more to locate there, the State or Federal government, or both, may have to lend a helping hand, by advancing to worthy young men and women, carefully selected, the financial means necessary for them to apply themselves to the study of medicine. If the proposition to require these State aided graduates to practice for a certain number of years in some designated country district smacks too much of the abolition of one's personal liberty, they could be required, when they become financially able, to pay back with interest the amounts advanced, thus creating a perpetual loan fund for the use of poor but worthy students. As the graduates become more numerous, some of them, by the sheer force of economic necessity, would naturally gravitate to the remoter rural districts.

The second problem, that of bad roads, is one to be solved chiefly by the community itself, perhaps, aided by the State and National governments. I am speaking now of the prosperous community. These communities can and, if the matter be properly and forcibly presented to them, most of them will, with or without aid, build good serviceable, hard surfaced roads. There is a field here for much missionary work, and I believe that the time has come when we physicians should endeavor by every means within our power to show these people the conditions that confront them, and state nrmly the results that must inevitably follow, unless these conditions are remedied.

As to the road problem in those communities that are not prosperous, it must be solved, if solved at all, by Federal and State aid. The proposed bond issue is woefully inadequate to even alleviate, let alone cure, bad road conditions in remote rural sections. Nor would an issue of one hundred million do this. Some other means, with or without this issue, must be devised by our law makers, if these sections are to have the roads of which they are so badly in need.

The problem of small fees in country practice can be remedied by the medical profession and by it alone. The majority of country practice is necessarily among the farming class. The farmer is proverbially careful and cautious in the expenditure of his hard earned dollars. Most of them, however, are fair and recognize a good business proposition when properly presented to them. If once convinced that, in order to obtain first class medical service, the fees must be materially increased, they will yield with the best grace possible. So, this is simply a matter in which the physician must educate his clientele. Of course there must also be co-operation among the physicians themselves.

The problem of good schools is one that any prosperous community can solve for itself, and in the wake of good roads and good schools will naturally follow wholesome, legitimate

and educational entertainment, recreation, and social intercourse.

In conclusion: Can these country communities secure and retain competent physicians? Yes, if they will pay the price. If they will make living conditions in the country attractive enough; otherwise, not. Unless this is done, physicians will continue in ever increasing numbers to shun and forsake the country and it will not be many years until a competent doctor in remote rural sections will be a *rara avis*, if, indeed, not entirely a thing of the past.

TETANUS: ITS ETIOLOGY, PROPHYLAXIS AND TREATMENT, WITH A REPORT ON CASES.*

By C. F. GRAHAM, A. B., M. D., Wytheville, Va.

Owing to the fact that for some unaccountable reason or reasons there has been in the past few years quite a noticeable increase in acute tetanus, in certain localities, notwithstanding we have at our command what I may call almost a perfect prophylactic, and as I have in the past two years personally treated, or been associated in the treatment of, four cases, after some trepidation I decided to write on tetanus as viewed by a general practitioner.

"1. From a study of the authorities on this subject it will be learned that in this country throughout the registration area deaths from tetanus have been rather uniform. 2. On the other hand in the British Isles tetanus infection is rising due to some cause and this rise began even before the war. 3. There has been, however, a marked diminution frim the single class of tetanus cases due to accidents with Fourth of July fireworks. From this cause in 1903 there were 415 deaths, in 1908 seventy-six and since 1911 proper prophylaxis and the sane Fourth idea have reduced these almost to a negligible degree."

In this country tetanus is most frequent in the Hudson Valley, Long Island, and the Atlantic States. A few years ago it was almost unheard of in Wythe County and the author can remember only one death from tetanus recorded prior to the last two years.

In the two years ending December 31st, 1922, however, there have been seven cases of acute tetanus in the county with four recoveries. Four of these cases came under the author's observation and will be reported in this paper.

*Read at the meeting of the Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

Tetanus is an infectious disease caused by the inoculation of the bacillus tetani in an initial wound. There are two main clinical varieties, the acute and the sub-acute, the acute developing in from one to ten days, usually seven, and the sub-acute in from ten to twenty-one days.

Etiology

The predisposing causes of tetanus are punctured, lacerated, and bruised wounds especially of the head and extremities which have been contaminated with dirt, particles of clothing, etc.; gun shot wounds, especially those of blank cartridges, all wounds containing foreign bodies, and those received in or near stables, manure pits, hog pens, chicken coops, and in fields where horses or cattle have been kept; also wounds contaminated with street dirt and all wounds where there is much destruction of soft parts with suppuration. The physician should bear in mind too that the removal of an encapsulated splinter or other foreign body has been known to be followed by tetanus, due to the freeing of spores into a freshly made wound and the destruction of the protecting membrane by the surgical procedure. *The exciting cause* of tetanus, of course, is the micro-organism itself which, gaining entrance through the wound, there multiplies and produces its toxin some of which, gaining admittance into the circulation, becomes fixed in the protoplasm of nervous tissue and some is absorbed by way of the peripheral nerve filament and, traveling along the axis-cyclinders to the nerve center, becomes fixed to the nerve cells, thereby producing the characteristic nervous manifestations.

Prophylaxis

The author wishes to state that he considers the prophylaxis of tetanus absolutely its most important treatment and the handling and cleansing of any wound which may be potentially the harborer of a tetanic infection should be carried out with the utmost care and, in all cases where there is the slighest chance of this infection developing, anti-tetanic serum should be administered. My main object in writing this paper is to stimulate the more frequent use of anti-tetanic serum, especially as there is an apparent increase in the incidence of this disease in our section.

The method of treating the wound and the antiseptics of choice depend to some extent on the conditions existing. If the wound is a

small punctured one, it should be well opened, thoroughly cleaned with hydrogen peroxide, cauterized with phenol and iodine, and then left open to heal, being dressed with some loose dressing that will not exclude air. If the wound is of large extent with much laceration and much foreign matter present, it should be thoroughly cleansed, the foreign matter being entirely removed even if to do so necessitates an anesthetic. The surgeon must bear in mind that extensive mutilating surgery can accomplish little and may even be harmful. Hydrogen peroxide should then be freely used, the wound dried, then painted with iodine. If too extensive for this, pour ether over wound and use wet dressing of Carrel-Dakin solution. Phenol solutions, permanganate, boric acid and bromine water solutions are also recommended. Personally, I always use peroxide of hydrogen, whatever other solutions are subsequently used as this is one place the peroxide acts as a good antiseptic as well as a cleansing agent since it gives off quite a lot of oxygen and the tetanus bacillus, being highly anaerobic, cannot stand oxygen. Also remember never to close a wound too closely but rather to allow healing by granulation. It is better to have a scar than a death. Next, all these cases should receive a prophylactic dose of tetanus antitoxin, 1,500 units, as soon after injury as possible and, if pus develops in the wound, if the wound be punctured so deep, or if the injurying instrument pass through any of the sinuses as the antrum of Highmore, or a gun shot wound of face or head or any injury where it is uncertain all foreign matter has been successfully removed, a second prophylactic dose of 1,500 units should be administered on the eighth or tenth day. Also, all cases coming to the physician for the removal of a foreign body, as splinter or wire from the finger, or piece of nail or a bullet from the foot, should receive the prophylactic dose of antitoxin. Even though the incubation period of acute or sub-acute tetanus has elapsed, as stated before in this paper, the surgical procedure of removing a foreign body which has been imbedded any length of time may break down the protecting wall and allow tetanus spores that were dormant to become active. A case is on record in which tetanus developed seventy days after the initial lesion. If these procedures are carried out the physician will be rewarded by almost 100 per cent prevention of tetanus and in those cases developing, following initial doses of prophylactic serum, cures are much more readily obtained.

Diagnosis

An early diagnosis of tetanus is not always an easy matter, yet it is a very important one, as the sooner active treatment is started the more favorable the prognosis. It is well that the general practitioner familiarize himself with its symptoms, especially the earlier ones, as it is to him that most of these cases first come.

The diagnosis is made on the clinical history of a wound, the type tetanus may be suspected in, the proper incubation period, together with tonic spasms of the following muscle groups not necessarily near the wound: masseters, posterior cervical, abdominal wall, spinal muscles, and the flexors of the extremities. These convulsions occur spontaneously, or follow either optic, acoustic, or tactile stimuli. Opisthotonos may occur and also the so-called sardonic grin. There is an increase of reflexes: those in the wounded limb often show "double jerk," throwing the muscles of that limb into tonic spasm. There is a rise in temperature, usually slight, as compared with the pulse rate which is rapid, poor in tension and volume; however, hyperpyrexia may occur and is sometimes the cause of death. Sweating is profuse and cyanosis often marked. Lockjaw usually occurs but is often not complete. Patient complains of severe thirst and exhaustion, and death sometimes occurs from exhaustion. The mentality usually remains clear to the end and patient suffers horrible mental and physical anguish.

It must be differentiated from strychnine poisoning and tetany. In strychnine poisoning, a history of the use of the drug is important. In strychnine poison the muscles of the jaw are rarely ever involved and never early. Between the spasms there is complete relaxation of the muscles, while in tetanus it is only partial. In tetany the spasms are bilateral and symmetrical and are chiefly confined to the muscles of the distal portions of the extremities. There is also the peculiar conical shaped involvement of the hands, and the feet are semiflexed at the ankle and the toes strongly flexed.

Treatment

For convenience, we will divide the treatment of active cases into general management; local treatment of wound; medical therapy or

symptomatic treatment; and specific or antitoxin therapy.

General Management: Patients with tetanus should be placed in as quiet a section of the home or hospital as possible. The room should be darkened and all external stimuli avoided. No company should be permitted and even the family excluded except those needed to care for the patient. Patient should be placed on soft and liquid diet that is nourishing. Fluids should be forced. If jaws become locked, highly nutrient enemata or feeding by tube through mouth or nose may be resorted to.

Local Treatment of Wound: The wound should be opened and freely drained, after a thorough cleansing and cauterization. In some cases there is no evidence of a wound, the puncture or abrasion having entirely healed even without scar.

Medical Treatment: The medical or symptomatic treatment of acute tetanus is mainly palliative, as it can hardly be considered curative unless we consider the phenol treatment of Bacilli, or the magnesium sulphate treatment of Meltzer curative. Most of the authorities consider these curative only secondarily by their sedative action on the central nervous system; however, phenol is thought by some to neutralize the toxin of the tetanus bacillus. In a recent talk on this subject with a veterinarian, I learned that they use the phenol treatment along with serum therapy with apparently excellent results, similar to those obtained in the Italian and French Armies.

If the magnesium sulphate treatment is employed, the physician must bear in mind that hypodermic or intraspinal injections of magnesium sulphate solution, while it usually entirely stops the spasms, are not without great danger, as they are very depressing to respiration. Chloral hydrate in from 5 to 10 gr. doses and potassium bromide in from 10 to 20 gr. doses every three or four hours will usually aid materially in controlling the paroxysms. If the combination of chloral and bromide does not control the attack sufficiently, or if there is much pain, morphine sulphate in ⅛ gr. doses every four hours is indicated or morphine ⅛ gr. and artopine 1/200 gr. may be used.

Specific Treatment or Serum Therapy: A study of the literature on this subject shows some difference of opinion as to routes recommended. Matthias Nicoll lays great stress on the intraspinal route, and S. O. Freedlander recommends keeping the blood stream as highly saturated with antitoxin as possible, while Wm. H. Park states that although antitoxin injected into the spinal canal and nerve trunk will block some if the toxin get free, it will not affect that already fixed to the nerve tissue, and the major portion is probably absorbed from the canal into the circulation and then has its effect by bathing the tissues through the blood stream and lymphatics. Therefore, as yet no arbitrary rule can be laid down for the antitoxin treatment of developed tetanus, except to say that the best results have been obtained by getting the patient thoroughly saturated with antitoxin as soon as diagnosed or better still as soon as it is strongly suspected since delay may mean death. I consider all tetanus cases should be hospital cases but recommend that, unless the hospital is within an hour or two journey, the physician obviate the delay by immediately giving the suspected patient 10,000 to 20,000 units intravenously and 10,000 units intramuscularly. Unless this is done, a delay of a few hours awaiting the train and the subsequent trip may result adversely.

Report on Cases

Case 1. A negro, male, fourteen years of age.

Complaint: Convulsions.

Present Illness: Seventeen days after having received a gun shot wound at base of spine, from blank shell, patient complained of stiffness of jaws, back of neck, and felt generally badly. On evening of 18th day, after having had several convulsions, I was called in and found an unmistakable case of developed tetanus.

Physical Examination: Temperature 102, pulse 130, respiration rapid and some cyanosis. Profuse sweating and patient very excited, reacting to the slightest stimuli of any type. Risus sardonicus and opisthotonos present. Marked rigidity of neck, back and abdominal muscles. Jaws partially locked. Patient able to swallow, but with some pain and difficulty.

Treatment: Morphine sulphate ⅛ gr., 1 dose. Bromide of potassium ten grains every four hours. Forced water and liquid nourishment. 6,000 units of tetanus antitoxin intravenously immediately. This amount was all that was available at time. It was necessary to wire for

larger amounts. Wound cleansed and dressed. Second day, 19th day after injury, routine treatment, 15,000 units antitoxin intravenously; 5,000 intramuscularly. Third day, patient more quiet, convulsions less severe and less frequent. No antitoxin. Pulse, temperature and respiration improved. Fourth day, routine treatment; 10,000 units antitoxin intravenously. Patient apparently about the same as third day. Fifth day, patient had a relapse and looked much like he did on first, except cyanosis and opisthotonos were more marked. Patient died early on sixth day apparently from exhaustion. Convulsions had ceased.

Case 2. A white adult, male, about thirty-five.

Complaint: Felt very badly and had headache two days. Slight stiffness of neck and back muscles; one spell of jerking or trembling of muscles.

Present Illness: Eight days before coming to us, patient fell on a rock in branch in his barn lot, cutting through his overalls, pants, and underclothes, bruising skin over knee cap and cutting it slightly. Then cleaned out stable and bedded horses for night. Applied iodine to cut and bruises on retiring.

Physical Examination: Temperature 100, pulse 120, respiration increased. Patient very nervous and fidgety, not characteristic of him when well. Wound on knee cap healed with slight scar. Slight swelling present with stiffness of knee joint. Very slight rigidity of neck and back, and masseter muscles. Jaws not locked. Knee jerks exaggerated and, following testing of same, slight convulsion of muscles of body generally. Patient's second convulsion.

Treatment: 10,000 units tetanus antitoxin intravenously. In fifteen or twenty minutes patient had moderate anaphylactic reaction although a desensitizing dose of antitoxin had been administered one hour previously to the intravenous dose. Became moderately cyanosed, complained of inability to get breath, severe gastric pain, and profuse sweating. One c.c. 1/1000 solution of adrenalin, ¼ gr. morphine, and 1/150 gr. atropine were administered hypodermatically. Patient apparently normal in twenty minutes or half hour. About three hours after second convulsion, patient had a third of about the same intensity, and about three hours later, while en route to hospital, a fourth of very much less severity. Wound was well opened and drainage established. Loose wet dressing applied; 10,000 units antitoxin were given intramuscularly. Patient went on to an uneventul recovery.

Case 3. The third case developed in a young man seven days after he had had two of his fingers blown off by the bursting of an old autombile casing. He complained of slight stiffness in back of neck and of having had several spells which he described as making him feel that he was about to float away in air. During these spells there was some slight trembling which could not be definitely called a convulsion, and patient became very nervous and anxious about himself. Temperature 101, pulse 120, respiration increased. Some slight cyanosis, sweating during spell, and a very, very slight tendency to opisthotonos. Reflexes increased but taking of same did not precipitate an attack. As patient's family did not wish serum used at home, he was rushed to hospital and treatment instituted in next two or three hours. This patient, I learned after his recovery, had received one large dose of antitoxin intravenously. He had one convulsion after arriving at hospital and the physicians attribute his quick recovery to the earliness with which treatment was instituted.

The following is not a report on a developed case but is given for what it is worth, as I have had two cases similar to it. The fourteen year old daughter of the case reported above as case two, while playing bare-footed, fell in same barn lot as her father, bruising and cutting her leg, not sufficiently however to stop her from continuing her play in and out of the barn. The wounds suppurated. On morning of fifth day after her injuries her father brought her to us, complaining of severe headache and general aching. Temperature 100, pulse 120, respiration normal. The child was nervous but reflexes not exaggerated and there were no definite symptoms of developed tetanus. Wounds were thoroughly cleansed and dressed. Prophylactic dose of tetanus antitoxin administered. Child returned for examination and treatment, on evening of next day (about thirty hours). The wounds were healing nicely, temperature and pulse both normal, and child stated headache and general bad feeling had left her in about six hours after her visit to office previous days.*

*Case four not reported on.

SUMMARY

1. Tetanus infection seems generally to be on the increase and especially in certain localities.

2. The prophylaxis of tetanus is its most important treatment. Preventive doses of tetanus antitoxin should therefore be administered in all cases where wounds have been received that are likely to be infected, and a second dose given eight or ten days later, if conditions warrant, in addition to the local treatment. In some instances even a third injection may be necessary.

3. Developed cases of tetanus, in addition to radical cleansing, removal of infected tissues, and symptomatic sedative treatment, should receive large doses of tetanus antitoxin intraspinally, intravenously, and intraneurally, or intramuscularly.

4. Tetanus cases are best handled in a hospital but the general practitioner should not delay administering an intravenous or intramuscular curative dose of antitoxin if many hours must elapse before transmitting patient to hospital.

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Other than those stated in text:
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Forchheimer—Therapeusis of Internal Diseases.
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AFTER TREATMENT OF OBSTETRICAL CASES.*

By H. R. FAIRFAX, M. D., Bristol, Va.

To prevent infection is of first importance. The eyes of the infant and open uterine veins of the mother are perhaps the most frequent points of entrance. Next come lacerations of soft parts of the mother. Immediately after the baby is born, see that any obstruction to respiration, as membranes over mouth and nose, or mucus in throat, are removed. Cleanse eyes with a solution of boric acid, then put a drop or two of nitrate of silver solution, one per cent, in each eye. This should be done in every case, whether you suspect gonorrhea or not. You had better use it in a thousand unnecessary cases than to neglect to use it in a single necessary case. It is surprising how many doctors in some sections still neglect this very important precautionary measure. A large per cent of the people in asylums and institutions for the blind, might be now enjoying life in the open with two good eyes, but for the neglect of some careless midwife, nurse or doctor.

I tie the naval cord three times. Some may ask why. First and second, to protect the child, and third to protect the mother, and, if there should be twins or triplets, to protect them. I had a friend who had the misfortune to lose a baby patient by not tying the cord but once, and as it was not tied tight enough, it slipped. The second ligature would more than likely have saved the child's life. I usually clamp the cord first with an artery clamp at points to be tied. This cuts through Wharton's jelly, leaves a nice groove for the ligature, bruises vessels in the cord, thus lessening the chance for hemorrhage or for ligature to slip.

If there is a laceration more than a small slit in the mucous membrane, I prefer to make immediate repair of the perineum. We can not hope to get as good union as we would at a later day, on account of the congestion and bruised tissues, but to leave an open lacerated wound, in my opinion, greatly increases the danger of infection.

The nipples should be bathed in boric acid solution just before and after each nursing for the first few weeks at least. If inclined to crack, zinc oxide ointment applied after each nursing gives much relief, hastens the healing and thereby removes another focus for infection. If the breasts are over distended and the baby is unable to keep the milk nursed out, the breast pump, hot applications and massage of the breasts may be necessary to keep the mother comfortable. The milk is thick and glands, especially in the primipara, are hard for a few days. Massage with the thumbs from without in towards the nipple will help to soften the glands, give the mother relief, and frequently prevent abscess or pressure necrosis. In multipara, where the breasts are large and heavy, the figure of eight sling is recommended. For the first twenty-four hours liquid or very soft diet is best.

Now comes the question as to the length of time the patient should remain in bed. I was taught that the ninth or tenth day was the earliest a patient should be allowed to get out of bed. It is still a disputed question and after twenty years' experience I am convinced that this length of time is not always necessary and in many cases the patient will fare better if

*Read at meeting of Southwestern Virginia Medical Society in Christiansburg, May 17 and 18, 1923.

allowed to be up earlier. My object in preparing a paper on this subject was, if possible, to get a discussion to bring out the ideas and compare the experience of others along this line. In the earlier years of my practice I had many obstetrical cases among women of foreign birth and in the mountain section of one of our neighboring states. Most of these women were strong and robust and frequently, while I was away, did as they pleased, which was to get up on the second or third day and, by the end of the tenth or fourteenth day they were doing their usual house work, with sometimes washing and ironing included.

About five or six years ago I read an article in one of the medical journals by Dr. W. S. Gardner, of Baltimore, in which he advocated letting obstetrical patients up early, if they were strong and robust. Let them be propped up in bed the second day, he said, and get out in a rocking chair for a short while on the third or fourth day. His claims were, a shorter period of confinement, better drainage and, as a result, fewer cases of infection, with more rapid recuperation. Since reading that article I have adopted that treatment, or rather advocated the early getting out of bed, but insist that the patient keep in the reclining position, and not stay up over one-half hour at first, then double the time each day and, after a day or two, divide the time, half in the morning and half in the evening.

I have had many women to tell me, that they felt better after getting up on the third or fourth day than they did in previous confinements on the ninth day.

I feel sure that many will disagree with Doctor Gardner and me in this and will say, subinvolution, relaxed abdominal walls, and other troubles follow such treatment. After five or six years' experience with this method and many subsequent examinations, I can truthfully say, so far as I can tell, my patients have had fewer infections and no more displacements of uterus and subinvolution than those in previous years, who were kept in bed for nine or ten days. If a patient has had a laceration, an unduly long labor, an instrumental delivery, or severe hemorrhage, I do not insist on her getting out quite so early, but wait a few days longer until she regains more strength, in other words, until she feels able to get out. She is instructed to have some one to assist her when she gets up, then, if she becomes faint, has a hemorrhage or much pain in her back, she is to return to bed at once.

In a recent letter of inquiry to Doctor Gardner, he makes the following reply: "My ideas about the value of the upright position after labor have not changed. The only difference is that all the labor cases that are normal that I see are in the hospital and I always insist that they have a Gatch bed and they are put in a partial sitting position for a part of the time from the very first. The instruction to the nurse is, 'Do not allow this patient to lie continuously on her back.' Since these patients are never flat on their backs for twenty-four consecutive hours and, after the first few days, sit bolt upright in bed, I do not bother much about what day they actually get into a chair, but tell them that they may get up whenever they want to. The infected cases, whether at full term or miscarriages, are put at once in the upright position without reference as to how long it has been since delivery and without reference to the type of infection. The higher the fever, the straighter you set them up. In the infected cases I do not simply tell them to get up, but have them bring in the old rocking chair and put them in it while I am there."

I usually give ergot or one of its derivatives, ergotole, ergotin, etc., soon after the delivery of the placenta and find, if the clots are expelled and uterus well contracted, that there will be fewer after pains, also fewer cases of subinvolution. Have patient or assistant to hold uterus in contracted condition for half-hour or longer as necessary. Keep bowels open, one action a day at least, and castor oil perhaps is the best if a purgative is needed. If this is given in hot sweet milk, it is practically tasteless. I usually prescribe a tonic, as L., Q. & S., to be taken for ten days or two weeks and this I believe will shorten the period of recuperation.

From two to six weeks after confinement a final examination is advised and, if the cervix is found lacerated, or there are other injuries or displacements, they may then be remedied or corrected.

POTT'S DISEASE, WITH SPECIAL REFERENCE TO ITS DIAGNOSIS.*

By Wm. F. FOGERS, M. D., Bristol, Va.

Credit for the first description[1] of the condition which has since borne his name has been ascribed to Percival Pott, who in 1779, pub-

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lished an account of this deformity in an article on palsy from spinal caries. Pott described the deformity and the sequelae of this condition although its tubercular nature was not mentioned. The discovery of the tubercle bacillus by Robert Koch, over one hundred years later (1882) shed new light upon the entire question of diseases of the bones and has helped solve many previously obscure problems of this nature.

Pott's disease is variously designated as tuberculosis of the spine, tuberculous spondylitis, vertebral tuberculosis, caries of the spine, angular curvature of the spine, kyphosis, humpback, etc.

Tuberculosis of the spine is a very common form of spondylitis. It may develop in persons of all ages, including the later years of life, but is most frequently found in children up to the tenth year. The condition is fairly well divided as to sexes, being encountered, perhaps, slightly more often in the male. It usually follows in the wake of lowered vitality, malnutrition or unhygienic surroundings and frequently, in childhood, closely upon an attack of measles, scarlet fever or whooping-cough.

The disease is essentially due to infection of the vertebra with tubercle bacilli, but its influence on the system, as contrasted with tuberculosis of other bones and joints, seems to be exerted to a greater degree on the entire mechanism of the body. Among the additional predisposing causes, traumatism and heredity claim an indefinite amount of consideration. The particular injury to which the patient may trace the beginning of the trouble may have been but a means of precipitating the latent condition. The question of the liklihood of the predisposition to hereditary transmission, as also the question as to whether the condition is primary in the vertebral column or secondary to tuberculous disease elewhere in the body is still debatable. Nor does the fact that the pulmonary tubercle is generally found at autopsy help to throw any light on the subject. According to Tubby's[2] observations, the sequence of events in children, in the majority of cases, is as follows: tuberculous dactylitis, glands, coxitis or other variety of arthritis persisting for some months or a year, followed by the onset of spinal caries—rarely is the reverse order of events observed.

It affects, primarily, the marrow of the vertebral body, the bony structures, such as the pedicles, laminae and lateral masses escaping invasion at the start. More often the anterior portions of the body are affected than elsewhere. In most cases the whole body of the vertebra is attacked, spreading from one to the other beneath the anterior ligament. As this osteomyelitic process advances, the bone becomes affected, softened, and gradually is crushed by the superimposed weight. The collapse of the vertebrae causes an angulation at the point of disease, the upper portion of the vertebral column falling forward, so that, at the point of angulation, one or more of the vertebra become prominent behind, producing the well-known deformity of "hump-back," or kyphosis. The infection is usually confined to one or more adjacent vertebra, rarely to two separate portions of the spinal column.

Among the various conditions consequent to a tuberculous lesion here, as elsewhere in the body, is the softening and breaking down of the tuberculous tissue and the formation of a tuberculous abscess, generally known as cold abscess. This may rupture the anterior ligament, at any time, and may finally reach the surface. In high cervical disease it usually reaches the posterior wall of the pharynx as a retropharyngeal abscess; in the dorsal region the abscess usually lies in the mediastinum or penetrates between the ribs and appears behind the diaphragm. In the lower dorsal and lumbar regions, it follows the course of the psoas muscle and appears above or below Poupart's ligament. In still other cases it penetrates the loin above the crest of the ilium, the outer border of the erector spinal muscle forming a lumbar abscess. Although most abscesses follow one of these courses, all sort of deviations are possible—into the lungs, pleura, intestines, bladder, scrotum, etc., sometimes disappearing without ever reaching the surface. As a result of displacement of the bones, the spinal cord may be compressed, producing symptoms of a compression myelitis.

In order to properly diagnose tuberculosis of the spine, a full understanding of the symptoms is also essential.

In children there is languor, loss of flesh and strength, lack of endurance and disturbance of sleep. If carefully watched, it will be noted that, whether standing or sitting, the child supports himself by the arms, by means of a table or chair. Stiffness in walking is observed, rigidity of the spine being one of the most characteristic symptoms. In walking, the

child first places his feet with care, to avoid a sudden jarring, shifting most of the weight to the toes. Another characteristic feature is evidenced when, in picking up an object from the floor, the patient instead of bending his back, holds himself stiff and straight. Pain is noted early, and is a constant symptom of Pott's disease. It may be either local or referred, the latter being by far the more difficult of diagnosis in the early stages. It is usually referred to the distribution of the peripheral nerves from the cord at the level of the disease. In other words, if the diseased vertebra is in the cervical region, the pain will be referred to the back of the neck or below the occiput. In the dorsal region the pain is referred to the chest or, when lower down, to the abdomen. Epigastric pain, in the majority of cases, is often wrongly interpreted as stomach or intestinal disease when, in reality, it is the result of tuberculous disease on the dorsal spine. Two cases of this kind suggest themselves to the writer, one in which a woman was operated for gall-stones, and which later developed into a typical case of Pott's disease with resulting severe deformity, the other case being that of a young girl erroneously operated upon for appendicitis. Both these diagnoses hinged on the finding of a psoas abscess. These abscesses are secondary to disease of the vertebra. It should be noted that signs and symptoms of acute inflammation, such as pain, heat, redness and tenderness, are missing in these abscesses. Fever is either slight or absent, unless there is a mixed infection; likewise is leukocytosis either slight or absent, unless the skin is perforated and there is a mixed infection. When the abscess approaches the skin and becomes palpable, the usual signs attendant upon similar conditions, such as fluctuation particularly, are present. If perforation of the abscess is imminent, the overlying skin becomes thin, shiny, slightly reddened and, finally, purple. The abscess consists of a creamy, so-called tuberculous pus, mixed with cheesy matter.

A psoas abscess gives the signs of a tense elastic tumor in the lower lateral quadrant of the abdomen. It if finds its way below Poupart's ligament, the communication between the abdominal tumor and the swelling of the thigh may often be made out by palpation. Pressure upon the abdominal swelling increases the tension in the thigh, and vice versa, thus differentiating the condition from *hernia*. In some cases a psoas abscess will present posteriorly upon the buttock. Those abscesses which follow the course of the psoas muscle are attended, first, by limitation of motion in the hip joint and, later, by a gradually increasing flexion of the thigh on the affected side, which cannot be overcome. It is usually not difficult to differentiate these abscesses from *tuberculosis of the hip joint* by the presence of an intra-abdominal tumor, in the former, and by kyphosis of the spine in the dorsal or lumbar region, respectively.

One of the main diagnostic features of the fairly well advanced stage of vertebral tuberculosis is the deformity caused by the collapse of the bodies of the affected vertebra. The result is a prominence of the vertebra in the back at the level of the disease, and angulation of the vertebral column. The kyphosis is most marked in the dorsal region where the spine is normally convex backward. Paralysis usually follows spinal deformity, but when these symptoms are reversed, confusion results.

A history of the case is essential. Often there will be elicited the history of a fall, a bruise or the like, which was perhaps unheeded at the time. In order to study the spine and to insure thorough observation, the patient should be stripped at the time of examination. It is often possible to make a probable diagnosis of Pott's disease by watching the motions, attitudes and general behavior of the patient. In the case of a child, it may at once be observed that so long as he is lying down or is held in the arms in such a position that the weight of the body does not compress the diseased vertebra, he will remain quiet and appear fairly comfortable. When placed in the upright position, however, he will immediately begin to cry. If the disease is advanced sufficiently, the deformity of the vertebra may be recognized at a glance, if situated in the dorsal region. The deformity will be less marked in the cervical and lumbar regions. One of the simplest means of detecting the presence of rigidity of the spine, as well as its locality, is to place the patient prone on a table and, by lifting the legs and thighs off the table, to observe the behavior of the different portions of the spine. As the patient is lifted from the table, the affected portion of the spine will remain absolutely rigid. If the disease is in the lumbar region, the muscles of the back will be thrown into spasmodic contraction. If in the cervical region, the rigid

position of the neck will be striking, even upon casual observation. In any case, if the patient is seated in an upright position, downward pressure upon the top of the head will call forth expressions of increased discomfort and pain. In the presence of tuberculosis in other regions of the body the cervical spine should always be palpated, and the pharynx and lateral regions of the neck examined for the presence of abscesses. Examination of the back should always be thorough. This may insure the finding of primary or secondary conditions. Difficulty in diagnosing the condition of the back may be due to lack of knowledge of the part, lack of thorough routine examinations, or failure to understand the mechanism involved. Many cases of pain in the back are encountered in connection with industrial work. In addition to the history of trauma, and a possible correlation of the occupation to the pain, a search for infection must not be omitted. Special attention must also be directed to posture and balance.

The following important points must also be included in order to ascertain all possible diagnostic signs: general condition, facial appearance, testing of reflexes, examination of the heart and vessels, thorax and pelvis, and above all, a full inspection of the spine accompanied by X-ray photographs.

The X-ray as a means of diagnosis is, unfortunately, of little worth in the early stages of the disease: later it is of value. The diagnosis of the first stages will have to be made on the symptoms and physical signs. Tuberculin tests have proven of the same assistance here as in tuberculosis of joints in other parts of the body.

The conditions which Pott's disease simulates are varied and numerous. They include, among others, *spinal fractures, torticollis, back strain, scurvy, rachitis, hip disease, spastic paralysis, pelvic abscess, sarcoma, carcinoma, sciatica, arthritis, spondylitis deformans, sacroiliac disease and syphilis.*

Typhoid spine may be mistaken for Pott's disease, but may be differentiated by its more acute onset, and by the fact that it occurs late in the course of typhoid. In typhoid spine the kyphosis seen in Pott's disease is rarely found. Where a bony ankylosis of two vertebrae occurs, typhoid spine may be suspected.

A positive Wassermann test and various other signs, combined with a history of syphilis, will differentiate *sphilitic arthritis* from tuberculosis of the spine. In children, the former condition is rarely found. There is usually less deformity, and the distinct kyphosis is lacking. When doubt exists, antisyphilitic treatment will settle the diagnosis.

Fractures or severe strains are among the conditions difficult to diagnose from Pott's disease, and in some cases, particularly in the cervical region, the differentiation is impossible unless confirmed by the X-ray. Treatment by fixation will cure the symptoms, even if of long-standing, only if disease is absent.

In view of the frequency of spinal caries, its importance to the general health of the patient, particularly in its connection with the spine—the central axis of the body—the subject is one which demands our earnest study and consideration. The question of diagnosis alone is an inexhaustible one, regarding which one is hardly able to do more than suggest its possibilities in a short article. Many textbooks deal at great length with this most interesting and tremendously important condition. In one of the most recent, Ely[3] regards the condition as a much more favorable one than have most of our previous writers on the subject and, in closing, the writer takes great pleasure in quoting from this publication, sounding, as it does, a more cheerful note than the prognosis usually called forth in connection with this condition:

"Until recently, the prognosis of tuberculosis of the spine was bad, but modern methods of treatment have changed the outlook. Prognosis in simple Pott's disease now is good. Abscess formation makes the prognosis unfavorable. Disease of the cervical region, on account of the proximity of vital structures, has an added danger. Under operative treatment, Pott's disease can be brought to a standstill within six months. Without operation, three years may be said to be the minimum duration of treatment. Perhaps by strict attention to details and by vigorous measures, the hump may sometimes be made a trifle smaller. Under modern methods of treatment the enormous humps, so frequently seen in former days, are growing rarer."

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Roanoke—The Convention City.

Bird's eye view of Roanoke, taken from aeroplane.

"They call me the Magic City, I who am young and strong—
They call me the Magic City, but the name that they give is wrong.

I was not built by magic, though the wand of a fairy I claim,
For the valley that's known as Roanoke, and the river that ripples my name.

I was not built by magic, but by sons of an ancient race,
Bold and dauntless of spirit, seeking a building place.

With the will and the strength of giants, fearless of struggle and strife,
They came from the vales of pioneer trails, steeled in the efforts of life.

Here by the crystal waters that flow from the mountain breast,
In the calm of the scented meadows, harboring peace and rest,
They set to the task of building in the alchemic mist of dawn,
And hammers rang as the builders sang of the work of their brain and their brawn."

To those who attend the annual meetings of the Medical Society of Virginia, with some degree of regularity, Roanoke probably needs no introduction. Those who have not attended a Roanoke meeting for some years may be interested in knowing what sort of a city it is at this time.

Hotel Roanoke, headquarters for meeting.

A young town, its age has not yet reached the fourth decade. Men not yet by any means aged have ploughed corn and hunted wild game where now stand imposing eight-story buildings and busy marts of trade, and surrounding these the homes of close to sixty thousand people. Protected by the encircling mountains, she enjoys a climate that knows naught of the extremes of heat and cold which other less favored regions may experience.

Surrounded by a rich agricultural country, Roanoke has an abundance, not only for her own support, but also to supply localities that consume more than they can produce. Broad, smiling, acres of grain, and of garden crops, and of alfalfa, lie just beyond her

outskirts. Factories and mills, whose bustle and whir never stop by day or by night, are part and parcel of her life, and whose pay-rolls furnish the sinews of war measured in hundreds of thousands. Two railroads, with wide-stretching arms extending east, west, north, and south, supply adequate and ever-busy facilities for communication with the world at large.

Space forbids mention of all the civic, and cultural, and patriotic organizations,—the Rotary, the Kiwanis, the Lions, the Men's and the Women's University Clubs, the Thursday Music Club, and Parent-Teachers' Association,—to name only a few; while of course there is a wide-awake Chamber of Commerce, and a Wholesale Merchants', and a Retail Merchants' Association in the business circles of the place.

Pre-eminently a city of churches, and of notably good church attendance, she has organizations of all the leading Christian faiths, and handsome edifices are dotted thickly within her boundaries. Largely a town of young people, Roanoke has had to exert every energy to keep pace with her amazingly fast-increasing school population, and it has been well-nigh impossible to build schools fast enough to house the youth demanding educational facilities.

In addition to its splendid public schools, Roanoke and vicinity lay claim to three of the best known colleges in this State—Virginia College, beautifully situated within the city limits, Hollins College, a short ride from the city, both for girls, and Roanoke College for boys at Salem—all recognized as among the best in Virginia. Fond memories are aroused in many by the mere mention of the names of these colleges and their fame extends far beyond the boundaries of our State.

Municipal building.

Of hotels there are some half a dozen, attractive in appearance and modern in every way, with cheerful, comfortable rooms, and a cuisine that will satisfy even the most fastidious; while of cafes and restaurants, they are beyond numbering. Hotel Roanoke, where the meetings will be held, is perhaps the most imposing in appearance, located on a slight elevation, with wide sweep of shaded lawn, whose maples touched by the breath of October, reflect all the tints of the glorious autumn sunsets. For those prefering the intimate close touch of the town the Ponce de Leon, or the Lennox, or the several other hostelries, stand always open.

Virginia College.

In the hospital line five commodious and excellently equipped establishments for whites, and a large and well-appointed one for colored people, supply every need in the way of medical and surgical treatment. Near at hand is also the State Sanatorium at Catawba, and even nearer that of Mount

Regis, both treating tuberculous cases.

Within the corporate limits of the city, eight minutes' ride on a trolley is Mill Mountain, a steep rampart one thousand feet above the town, ascended by cable cars, the view from whose summit is unsurpassed. A small hotel on top, noted for its chicken and waffle suppers, is a well patronized rendezvous in the social life of the community.

The Roanoke Academy of Medicine is well

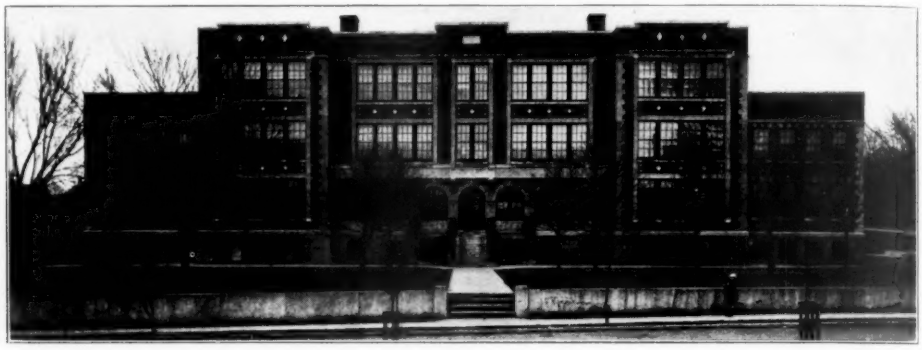
Crystal Spring, Roanoke's chief water supply.

Elks' Home.

Public Library in Elmwood Park.

known throughout the State as one of the live and active medical organizations: and it is at this time working with the utmost earnestness to make the 1923 meeting a thorough success. It is the hope of every fellow of this local society, that ALL members of the State Society, and every doctor in the State who can lay aside his work for even a day or two, will attend some if not all the sessions at this meeting.

Don't Fail To See The Magic City. The ladies will find much of interest in Roanoke, while the members are engaged in matters scientific.



Park Street High School.

Proceedings of Societies

The Southwestern Virginia Medical Society

Held its reugular meeting at Abingdon, September 19 and 20, with an attendance of about sixty. The following officers were elected for the ensuing year: President, Dr. S. S. Gale, Roanoke; vice-president, Dr. D. L. Kinsolving, Abingdon; and secretary-treasurer, Dr. E. G. Gill (re-elected), Roanoke. The next meeting will be held at Radford, March 20 and 21, 1924. Two new members were received at this time: Drs. A. B. Graybeal, of Grant, and Hall, of Radford.

Drs. J. C. Motley, J. J. Giesen and Arthur Hooks were elected delegates to the Roanoke meeting of the Medical Society of Virginia, and Drs. T. K. McKee, W. W. Chaffin and H. R. Fairfax, alternates.

Botetourt County Medical Society.

Present officers of the Botetourt County Medical Society are Dr. E. W. Dodd, Buchanan, president, and Dr. P. K. Graybill, Fincastle, secretary. Dr. E. P. McCulloch, Troutville, was elected delegate and Dr. A. W. Hammond, Amsterdam, alternate to the Roanoke meeting of the Medical Society of Virginia.

Alleghany County Medical Society.

Present officers of the Alleghany County (Va.) Medical Society are: Dr. J. A. Riffe, Covington, president; Dr. J. M. Emmett, Clifton Forge, vice-president; Dr. H. M. Anderson, Clifton Forge, secretary; and Dr. W. M. Revercomb, Clifton Forge, treasurer.

The Danville (Va.) Academy of Medicine,

At its regular meeting on September 11, elected the following officers for the ensuing year: President, Dr. C. B. Pritchett; vice-president, Dr. H. J. Langston; secretary-treasurer, Dr. Samuel Newman. Dr. R. Bruce James was elected delegate to the State Society meeting in Roanoke.

Book Announcements

Surgery of the Spine and Extremities. A Text Book for Student and Practitioners. By R. TUNSTALL TAYLOR, M. D., F. A. C. S., Professor of Orthopedic Surgery, University of Maryland and College of Physicians and Surgeons, etc. Philadelphia. P. Blakiston's Son and Company. 1012 Walnut Street. 8vo. 550 pages, with 604 illustrations. Cloth. Price $7.50.

A Textbook of Chemistry for Nurses. By FREDUS N. PETERS, A. M., Ph.D., Author of several books; Professor Organic Chemistry, Hahnemann Medical College, Director of Laboratories and Professor of Chemistry and Metallurgy, Kansas City Dental College; Instructor in Chemistry in Kansas City Central High School for 23 years; etc. Illustrated. Second Edition. St. Louis. C. V. Mosby Company. 1923. 12 mo. 302 pages. Cloth. Price $2.50.

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Editorial

Discovery of Anesthesia.

Medical men everywhere feel a keen interest in the fascinating story of the discovery of anesthesia. But particularly in the South this important historical medical event is of especial interest for reasons to be discerned in the perusal of the gripping recital by Dr. J. Marion Sims, reproduced in the editorial space of this journal, under circumstances given in the subjoined letter.

Richmond, Va.,
June 22, 1923.

To The Editor:

Dr. P. A. Wilhite of Anderson, S. C. has recently been a patient at St. Luke's Hospital, and while here showed me a copy of the Virginia Medical Monthly issued in May, 1877, containing the original article on "The Discovery of Anesthesia" by J. Marion Sims.

I was so much interested in the paper that I got my stenographer to make me a typewritten copy. Knowing your interest in medical history, I send a copy of the article to you, believing that possibly some day you may reproduce it either in whole or in part in the Virginia Medical Monthly.

Stuart McGuire.

THE DISCOVERY OF ANESTHESIA.

By J. Marion Sims, M. D., New York.

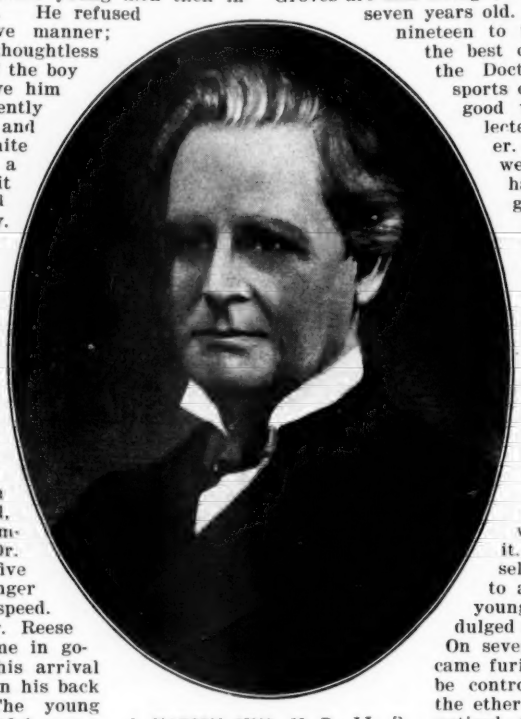
Long before the days of Horace Wells and of Morton and Jackson, we were on the eve of the discovery of anesthesia. In 1790, Priestly discovered nitrous oxide gas. In 1799, Sir Humphrey Davy experimented with it, and in 1800, he published his Researches, Chemical and Philosophical, chiefly concerning Nitrous Oxide Gas and its Respiration, in which he says, "As nitrous oxide in its extensive operations, appears capable of destroying physical pain, it may probably be used with advantage during surgical operations, in which no great effusion of blood takes place." Sir Humphrey Davy had inhaled the gas repeatedly for headache and other painful affections and, finding relief for the time, he suggested its use as an anesthetic in surgery, and if he had been a sugeon, there is no doubt he would have used it as such. But his great idea was lost to the world for more than forty years.

There are four claimants for the honor of the discovery of anesthesia, viz.: Crawford W. Long, of Athens, Ga.; Horace Wells, of Hartford, Conn.; W. T. G. Morton and Charles T. Jackson, of Boston. I propose to give a plain statement of facts bearing on the question, leaving the reader to draw his own conclusions.

The claims of Long have never been fairly stated in connection with those who came after him. I am ashamed to say I was wholly ignorant of them until a very recent day, and I believe that the great mass of the profession are in the same category with me. I became acquainted with the facts of Long's labors by mere accident.

In October, 1876, Dr. P. A. Wilhite, of Anderson, S. C., came to New York to consult me about the health of his daughter. Her case required a surgical operation, and it was necessary for her to take ether, which was given by Dr. Harry Sims. After the operation was over and we were waiting to see our patient fully restored from the effects of the anesthetic, the conversation naturally turned upon the wonders of anesthesia, when Dr. Wilhite said, "Doctor, I assisted at the first operation ever performed under the influence of ether." I said, "But how could this be when you have never been in Boston, and the first operation under ether was by Warren, of Boston, in October, 1846, or as some claim by Marcy of Hartford, in January, 1845." Dr. Wilhite then told me that he had assisted Dr. Crawford W. Long, of Georgia, in extirpating a tumor from the neck of Mr. Venable in March, 1842, while he was completely anesthetized by the inhalation of sulphuric ether—that Mr. Venable was as profoundly anesthetized as the patient then lying before us—and he also said that he had assisted Dr. Long to operate on other patients under the influence of ether in 1843 and '44, while he was a student of medicine in Dr. Long's office. He declared that Long was the real and original discoverer of anesthesia, and he believed that he would be so acknowledged if all the facts in the case were fully set forth. He further said that he presumed that he (Dr. Wilhite) was the first person who had ever profoundly etherized any one—and it was under these circumstances. Dr. Wilhite says that from the time he was ten years old (1832) he was familiar with the use of ether by inhalation as an excitant; that the boys and girls in his neighborhood near Athens, Ga., were in the constant habit of using it; that there was hardly ever a gathering of young people that did not wind

up with an ether frolic. Old fashioned "quiltings" were very common in his day and time, and in the evening the boys and the young men would go to these for the purpose of a dance or an ether frolic. On one occasion he met several young people at Mr. Ware's, about five miles west of Athens, at a quilting. The girls and boys all finished the evening by inhaling ether. Some would laugh, some cry, some fight and some dance, just as when nitrous oxide gas is inhaled. It was in the fall of 1839. Wilhite was a romping boy of seventeen. All the boys and all the girls had inhaled ether, some of them more than once. They were looking around for new subjects for it, when Wilhite saw a negro boy at the door who seemed to be enjoying the sport. Wilhite invited him to come in and try the ether. He refused. Other young men then insisted on his taking it. He refused again in a most positive manner; whereupon some of the thoughtless young men caught hold of the boy and called Wilhite to give him ether. He struggled violently but they threw him down and held him there while Wilhite poured out some ether on a handkerchief and pressed it firmly over his mouth and nose. He fought furiously. They persisted, thinking it was great fun. After a long struggle the boy became quiet and unresisting. The young men then let him alone. They were greatly surprised that he did not get up immediately and say or do some foolish thing for them to laugh at. He lay quietly and with stertorous breathing. They tried to arouse him but could not. They then became greatly alarmed, and sent one of their number on horseback for Dr. Sydney Reese, of Athens, five miles away. The messenger rode with all possible speed. He fortunately found Dr. Reese at home, who lost no time in going to Mr. Ware's. On his arrival he found the negro lying on his back still soundly asleep. The young ladies had left the frightful scene. Young Wilhite and his principal accomplice, thinking that they had in mere play murdered their fellow being, were so much alarmed that they contemplated making their escape from the country, but the timely arrival of Dr. Reese soon restored their courage. Dr. Reese heard the history of the transaction. He then threw water in the face of the sleeping negro, slapped him, raised him up, shook him violently, and after a little he was raised to consciousness, greatly to the relief of all present. The doctor then gave the youngsters a lecture of the dangers of such frolics, and cautioned them against a repetition of their heedless act. This, of course, broke up the ether frolics in this neighborhood. Dr. Wilhite thinks it was more than an hour from the time the messenger started for Dr. Reese, till he returned with him to Mr. Ware's. The distance to Athens and back was ten miles, and all this time the negro boy was profoundly narcotized. This is unquestionably the first case in which sulphuric ether was ever given to the extent of producing complete anesthesia.



J. MARION SIMS, M. D., LL. D
Taken from portrait in the Valentine Meat Juice Company's offices, Richmond, Va. (Courtesy of Col. Mann S. Valentine, Jr.)

Dr. Crawford W. Long, now of Athens, Ga., was born in Danielsville, Madison County, Georgia, on the 1st of November, 1815. He graduated at the University of Georgia (then the Franklin College), in 1835. He studied medicine and graduated at the Medical Department of the University of Pennsylvania, in 1839. He then went to Jefferson, Jackson County, Georgia, where he practised medicine for many years. In 1842 he had four students in his office, viz.: P. A. Wilhite, John S. Groves, D. I. Long and H. R. P. Long. The two last were relatives of Dr. Long, and they are both dead. Wilhite and Groves are still living (1877). Dr. Long was twenty-seven years old. His pupils were all from nineteen to twenty-one; they were on the best of terms with each other, the Doctor entering into all the sports of his pupils with a hearty good will, while he never neglected his duties as their teacher. On one occasion, they were talking about the inhalation of nitrous oxide gas, when one of his pupils asked him to make some for them. He said he did not have suitable apparatus for it, but that the inhalation of sulphuric ether would produce precisely the same exhilarating effect. One of the young men present said he had inhaled ether while at school, and was willing to do it again. They were all anxious to witness its effects. Dr. Long got some ether immediately and gave it to the young man who had previously inhaled it. He then inhaled it himself, and afterwards gave it to all present. After this, the young doctor and his pupils indulged occasionally in ether frolics. On several occasions, Dr. Long became furiously excited and could not be controlled. On recovering from the ether intoxication, he frequently noticed that his arms and hands were badly bruised, and yet he was not conscious of having felt any pain at the time he was under the influence of the ether. He also noticed the same thing in his pupils. They were often badly hurt by falls and blows and were not conscious of pain at the time. These facts, repeatedly observed suggested to his mind the idea of using ether to prevent the pain of surgical operations. He frequently spoke of this to his students, and at last he determined to give it a trial. Wilhite encouraged him by relating the case of the negro boy he had playfully and unintentionally put under the influence of ether for an hour or more in the Fall of 1839.

Dr. Long, having made up his mind to try the experiment with ether on the first favorable opportunity, says (*Southern Medical and Surgical Journal*, Dec. 1849):

"The first patient to whom I administered ether

in a surgical operation, was Mr. James M. Venable, who then resided within two miles of Jefferson. Mr. Venable consulted me on several occasions with regard to the propriety of removing two small tumors situated on the back part of his neck, but would postpone from time to time having operations performed, from dread of pain. At length I mentioned to him the fact of my receiving bruises while under the influence of the vapor of ether, without suffering, and, as I knew him to be fond of, and accustomed to inhale ether, I suggested to him the probability that the operations might be performed without pain, and proposed operating on him while under its influence. He consented to have one tumor removed, and the operation was performed the same day. The ether was given to Mr. Venable on a towel; and when fully under its influence I extirpated the tumor. It was encysted, and about half an inch in diameter. The patient continued to inhale ether during the time of the operation, and when informed it was over, seemed incredulous, till the tumor was shown him. He gave no evidence of suffering during the operation, and assured me, after it was over, that he did not experience the slightest degree of pain from its performance." This operation was performed on the 30th of March, 1842.

"The second operation I performed upon a patient etherized was on the 6th of June, 1842, and was on the same person (Mr. Venable), for the removal of another small tumor. This operation required more time than the first, from the cyst of the tumor having formed adhesions to the surrounding parts. The patient was insensible to pain during the operation, until the last attachment of the cyst was separated, when he exhibited signs of slight suffering, but asserted after the operation was over that the sensation of pain was so slight as scarcely to be perceived. In this operation the inhalation of ether ceased before the first incision was made."

In a certificate sworn to by James M. Venable, on the 23rd of July, 1849, he says: "In the early part of the year (1842), the young men of Jefferson and the country adjoining were in the habit of inhaling ether for its exhilarating powers, and I inhaled it myself frequently for that purpose, and was very fond of its use. While attending the Academy, I was frequently in the office of Dr. C. W. Long, and having two tumors on the side and rather back of my neck, I several times spoke to him about the propriety of cutting them out, but postponed the operation from time to time. On one occasion, we had some conversation about the probability that the tumors might be cut out while I was under the influence of sulphuric ether, without my experiencing pain, and he proposed operating on me while under its influence. I agreed to have one tumor cut out and had the operation performed that evening (afternoon), after school was dismissed. This was in the early part of the Spring of 1842. I commenced inhaling the ether before the operation was commenced, and continued it until the operation was over. I did not feel the slightest pain from the operation, and could not believe the tumor was removed until it was shown to me. A month or two after this time, Dr. C. W. Long cut out the other tumor situated on the same side of the neck. In this operation, I did not feel the least pain until the last cut was made, when I felt a little pain. In this operation, I stopped inhaling the ether before the operation was finished. I inhaled the ether in both instances from a towel, which was the common method of taking it." Dr. Long's four students, Wilhite, Groves and the two Longs, also E. S. Rawls (now Dr. Rawls), and Andrew J. Thurmond, were present and assisted at the operation. Dr. Wilhite tells me that the etherization of Venable was as complete as it is ever made now-a-days, and that Venable always declared that he felt no pain during the operation.

On the 3rd of July, 1842, Dr. Long amputated the toe of a negro boy, Jack, belonging to Mrs. Hemphill. Jack felt no pain, having been completely anesthetized.

On the 8th of September, 1842, Dr. Long exsected, without pain, three small cystic tumors from the head of Mrs. Mary Vincent, who was etherized for the purpose.

On the 8th of January, 1845, Dr. Long amputated two fingers for a negro boy belonging to Mr. Ralph Bailey, Sr., the patient being fully etherized and feeling no pain whatever.

* * * * * *

Now let us see how the followers of Long worked out the problem of anesthesia without any knowledge whatever of his labors.

Horace Wells, a native of Hartford, Windsor County, Vermont, studied dentistry in Boston, and at the age of 21 (1836), he opened an office in Hartford, Connecticut, to practice his profession. His mind was early turned to the subject of preventing pain in the extraction of teeth. In August, 1840, Dr. L. P. Brockett, of Brooklyn, N. Y., then a medical student, went to Wells to have a molar tooth extracted, the operation was difficult and so painful that Wells said that there ought to be some method of mitigating such suffering, and that he thought a man might be made so drunk by the inhalation of nitrous oxide gas as to prevent the pain of dental and other operations. This shows how deeply impressed this subject was upon the mind of Wells at that early date. On December 10, 1844, Mr. G. Q. Colton delivered a lecture in Hartford, Connecticut, on "Laughing Gas," and after the lecture he administered the gas to Wells and several other gentlemen. One of them (Mr. Cooley), while under its influence, fell over some benches, and was evidently badly injured; when he returned to consciousness, Wells rushed up to him and inquired if he was hurt.

He replied "No." Wells then said, "You must have been hurt, for you struck your legs against the benches." The young man then, at Well's suggestion, pulled up his pantaloons; the blood was running down his legs and his knees were badly injured. When again questioned by Wells, he said, "I did not feel any pain at the time." Wells then turned to a friend (Mr. David Clarke), who was near by, and an eye witness to all of this, and remarked, "I believe a man by taking that gas could have a tooth extracted or a limb amputated and not feel the pain." So thoroughly was Wells convinced of this fact that he told his wife on their way home that he intended to take the gas the next day and have a tooth extracted. On arriving home he left his wife, and went to see his friend, Dr. Riggs, to announce his great discovery, and his intention to take the gas for the extraction of a tooth. Riggs tried to dissuade him from it, but his mind was made up, and he said, "As the young man did not feel pain at the time he was hurt, why cannot gas be used in the extraction of teeth?" Early next morning (December 11th), Wells called on Colton and engaged him to go to his office at ten o'clock and give him the gas. Wells did not seem to feel any pain. He remained unconscious for a few moments, and on coming to, he exclaimed, "A new era in tooth pulling. It did not hurt me more than the prick of a pin. It is the greatest discovery ever made."

From that moment Wells' enthusiasm was un-

bounded. He immediately began the administration of gas, and daily extracted teeth under its influence, and other dentists in Hartford adopted the same practice with like success. Dr. Marcy, then of Hartford, on witnessing Wells' operations, told him that when a student at Amherst College, he, with other students, had, for amusement, often inhaled nitrous oxide gas and also the vapor of sulphuric ether, and that the effects of the two were identical; and he suggested to Wells to try ether as a substitute for the gas. On this hint Wells tried it. He inhaled it himself and he says, "I found it very difficult to inhale the vapor of ether in consequence of the choking sensation. For this reason and the reason that Dr. Marcy and myself came to the conclusion that nitrous oxide gas was not so liable to do injury, I resolved to adhere to this alone."

About a month after the discovery of anesthesia by Wells, Dr. Marcy (January, 1845), gave the vapor of sulphric ether to a sailor for the extirpation of a small wen on the side of his head. The patient was insensible and the operation successful, but Marcy, after this experiment, still advised Wells to stick to the gas as being more agreeable, and, perhaps safer than ether. Wells continued the use of the gas, and the dentists, (Riggs, Terry, Braddock and Crowfoot), and the doctors in Hartford were all convinced of its value as an anesthetic. But Wells felt that his great discovery should be laid more broadly before the profession of the world, and early in 1845 went to Boston for this purpose. Through his former pupil and partner, Dr. Morton, dentist, he was introduced to Dr. John C. Warren, Dr. Charles T. Jackson, Dr. Hayward and others. Dr. Warren received him kindly, and Wells remained in Boston several days with the expectation of giving the gas to a man who was to submit to an amputation at the hands of Dr. Warren. For some cause the operation was postponed. Wells was then invited to address the class at the medical college on the subject. He did so at some length, and then administered the gas for the extraction of a tooth. Unfortunately, the gas-bag was removed too soon; the patient was not sufficiently anesthetized; he screamed out and said he felt the pain of extraction, and the experiment was therefore a failure. Wells was hooted at and unfeelingly hissed out of the amphitheatre by the thoughtless young men present, and he was pronounced a charlatan and his anesthetic a humbug. He returned home greatly mortified at his failure, was taken suddenly ill and did not recover his health for many weeks.

In 1841-42, Morton was a pupil of Wells. In 1843 Wells established Morton in Boston, and for a while he was his partner. In 1845-46, after Wells' discovery of anesthesia, by the use of nitrous oxide gas, they had frequent interviews, sometimes in Boston and sometimes in Hartford. After Wells' unfortunate visit to Boston, Morton became greatly interested in the subject of anesthesia. Notwithstanding Wells failure in Boston, Morton subsequently witnessed his continued success with the gas in Hartford, and was anxious to try it again in Boston. During one of his visits to Wells in Hartford, in 1846, Morton asked Wells to show him how to make the gas. Wells not having time, referred him to Dr. Charles T. Jackson to make it for him, as he was a chemist. On returning home, Morton called on Jackson for this purpose. Jackson told Morton that the manufacture of nitrous oxide gas required some nicety of manipulation, that there was danger of his getting nitric instead of nitrous oxide, and that he was too busy at that time to make it for him. Morton explained that he wished to use it to render patients insensible for the extraction of teeth. Jackson then told him to use the vapor of sulphuric ether, saying that it was perfectly safe, could be easily procured, and that the students at Cambridge often inhaled it for amusement.

On the evening of the day (September 30, 1846), that Morton had this interview with Jackson, he gave the ether to a patient, and extracted a tooth without pain; and on October 16th he gave it in the Massachusetts General Hospital to a patient who had a tumor exsected from the neck by Dr. John C. Warren. On the next day (October 17), he gave it to another patient for Dr. Hayward, who exsected a tumor from the arm. He gave it also for Dr. Bigelow with equal success; and from that time it came rapidly into use by the whole profession throughout the civilized world. On October 27, 1846, Jackson and Morton published to the world, by letters patent, the discovery of letheon as an anesthetic, but it was seen at once that their letheon was nothing more or less than pure sulphuric ether. Jackson soon resigned his interest in the patent to Morton, and sent a communication to the French Institute, claiming the honor for himself for the discovery of anesthesia by ether. Morton then set up his claim as the real discoverer, giving Jackson credit only for some unimportant suggestions. While Jackson and Morton were sending bulletins to the Institute of France, Wells sailed for Europe in December, 1846, to lay his claims before the French Institute as the real discoverer of anesthesia. His mission was a failure and he returned home in March, 1847, to prepare the documents upon which his claim was to be presented to the Institute. And thus the tripartite war was waged with great fury, Morton and Jackson denying everything to Wells, and denying everything to each other.

They denied that nitrous oxide gas had any anesthetic properties. Wells brought forward his Hartford experience, and he gave the gas for surgeons in general practice, proving that prolonged operations could be performed under its influence. Dr. Marcy exsected a large gland, the patient being under the gas for fifteen minutes; Dr. Ellsworth amputated a thigh; and Dr. Beresford exsected a large tumor under its influence—all in Hartford. But not withstanding all this, Wells saw nitrous oxide gas supplanted by sulphuric ether as an anesthetic—ether which he had tried and rejected. He saw his claims as the great discoverer of anesthesia unrecognized abroad, disputed and set aside at home, and he was disappointed and dispirited. He then went to New York to lay his claims as the discoverer of anesthesia before the profession of the great metropolis. Soon after his arrival in New York, he showed signs of mental aberration, and on January 14, 1848, in a fit of madness, he ended his life with his own hands.

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Now let us summarize the facts set forth in the foregoing historic sketch. We know:

1st. That since 1800, the inhalation of nitrous oxide gas produced a peculiar intoxication, and even allayed headache and other minor pains.

2nd. That Sir Humphrey Davy proposed it as an anesthetic in surgical operations.

3rd. That for more than fifty years the inhalation of sulphuric ether has been practiced by the students in our New England colleges as an excitant, and that its exhilarating properties are similar to those of nitrous oxide gas.

4th. That the inhalation of sulphuric ether, as an excitant, was common in some parts of Georgia forty-five years ago, though not practiced in the Colleges.

5th. That Wilhite was the first man to produce

profound anesthesia, which was done accidentally with sulphuric ether in 1839.

6th. That Long was the first man to intentionally produce anesthesia for surgical operations, and that this was done with sulphuric ether in 1842.

7th. That Long did not by accident hit upon it, but that he reasoned it out in a philosophic and logical manner.

8th. That Wells, without any knowledge of Long's labors, demonstrated in the same philosophic way, the great principle of anesthesia by the use of nitrous oxide gas (1844).

9th. That Morton intended to follow Wells in using the gas as an anesthetic in dentistry, and for this purpose asked Wells to show him how to make the gas (1846).

10th. That Wells referred Morton to Jackson for this purpose, as Jackson was known to be a scientific man and an able chemist.

11th. That Morton called on Jackson for information on the subject, and that Jackson told Morton to use sulphuric ether instead of nitrous oxide gas, as it was known to possess the same properties, was as safe, and easier to get.

12th. That Morton, acting upon Jackson's off-hand suggestion, used the ether successfully in the extraction of teeth (1846).

13th. That Warren and Hayward and Bigelow performed important surgical operations in the Massachusetts General Hospital (October, 1846), on patients etherized by Morton, and that this introduced and popularized the practice throughout the world.

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News Notes

Roanoke Welcomes You!

Doctors of Virginia, this applies not only to you but also to the ladies in your families.

Roanoke, one of the most progressive of the cities of Virginia, is pictured somewhat in detail under the heading "Roanoke—The Convention City," in this issue of the journal. Her citizens are enthusiastic and ever active in promoting the interest of their city and are truly "given to hospitality." You will find this out for yourself if you can avail yourself of the opportunity of attending the fifty-fourth annual meeting of the Medical Society of Virginia in that city, October 16, 17, 18 and 19.

Programs of this meeting should be in the hands of all members, having been mailed the first part of this month. If you have not secured your railroad certificate for the one and a half fare for the round trip, apply at once to the Secretary at the Society's offices in Richmond. The scientific and social features will be interesting. We will have as invited guests men whom you will wish to meet and hear. Good papers will also be presented by members. The ladies will find much of interest in the work of the Woman's State Auxiliary to the Medical Society of Virginia and in the social affairs arranged for them.

If you have not made hotel reservations, it would be well to attend to this prior to reaching Roanoke. There are five hotels in Roanoke, as follows: Hotel Roanoke, Shenandoah Hotel, Ponce de Leon Hotel, Lenox Hotel, and Raleigh Hotel. Railroad schedules make Roanoke very accessible from all parts of the State.

A large attendance is anticipated and you will wish to be "among those present."

At the time of going to press, the following is list of delegates appointed from the various component societies of the State Society. If you have not yet appointed a delegate, it is not too late for representation. If impossible to have a meeting to elect delegates, have president of your local society make the appointment.

Delegates

Arlington County Medical Society—Dr. Stacey T. Noland; *alternate*, Dr. R. N. Sutton.

Bedford County Medical Society—Dr. W. O. McCabe; *alternate*, Dr. J. A. Rucker.

Botetourt County Medical Society—Dr. M. T. McCulloch; *alternate*, Dr. A. W. Hammond.

Danville Academy of Medicine—Dr. R. Bruce James.

Dinwiddie County Medical Society—Dr. F. J. Wright; *alternate*, Dr. J. M. Harwood.

Fairfax County Medical Society—Dr. F. M. Brooks; *alternate*, Dr. Tom Williams.

Floyd County Medical Society—Dr. C. W. Thomas; *alternate*, Dr. J. L. Harvey.

Nelson County Medical Society—Dr. J. B. Woodson; *alternate*, Dr. D. C. Wills.

Piedmont Medical Society—Drs. J. C. Flippin and Lewis Holladay; *alternates*, Drs. J. H. Neff and John W. Scott.

Richmond Academy of Medicine and Surgery—Drs. J. A. Hodges, M. W. Peyser, W. B. Blanton, E. G. Hill, A. L. Gray, M. E. Nuckols and M. P. Rucker; *alternates*, W. L. Peple, G. A. Ezekiel, Manfred Call, C. F. Ross, Fred Hodges, W. Nelson Mercer, and T. W. Murrell.

Roanoke Academy of Medicine—Drs. Claude Moore and T. Allen Kirk; *alternates*, Drs. J. D. Willis and J. R. Garrett.

Rockingham County Medical Society — Dr. J. E. Lincoln; *alternate*, Dr. George G. Snarr.

Southampton County Medical Society—Dr. R. L. Raiford.

Southside Virginia Medical Association—Dr. George H. Reese.

Southwestern Virginia Medical Society—Drs. J. C. Motley, J. J. Giesen and Arthur Hooks; *alternates*, Drs. T. K. McKee, W. W. Chaffin and H. R. Fairfax.

Wise County Medical Society—Dr. G. B. Setzler; *alternate*, Dr. C. B. Bowyer.

Norfolk County Medical Society—Drs. E. C. S. Taliaferro, P. St. L. Moncure, Julian L. Rawls, J. D. Collins and A. A. Burke.

Warren-Rappahannock-Page Medical Society—Dr. D. M. Kipps.

Medical Association of the Valley of Virginia—Dr. F. M. Leech.

Dr. Susan Field,

After spending sometime at Lincoln, Nebr., has returned to Farmville, Va., and resumed her duties in the Normal School in that place.

Southern Medical Association.

This Association is to hold its seventeenth annual meeting in Washington, D. C., November 12-15, inclusive, under the presidency of Dr. W. S. Leathers, of Jackson, Miss. This promises to be one of the "biggest" meetings in the history of the Association. There will be twenty sections and many papers of interest will be presented. In addition to the scientific program there will be golf, alumni reunions and entertainments for members and their wives and daughters.

The New Willard will be general hotel headquarters for this meeting. There are many excellent hotels in addition to this and accomodations will be ample.

It is planned to have an alumni dinner of the various medical schools represented in the membership. The time for this dinner has been set for Wednesday evening, November the 14th, and dining rooms have already been engaged. The Committee in charge wishes to know approximately the number of diners to be expected at each of these reunions and asks that those who expect to attend notify Dr. Tom A. Williams, Chairman of this Committee, 1746 K Street, Washington, D. C., by the end of October. Associated with Dr. Williams in looking after alumni from schools in this section are: Drs. R. B. Carmichael, Virginius Dabney, J. D. Thomas, W. H. Wilmer, W. B. Mason and B. M. Randolph.

The President of the United States will receive informally the members of the Southern Medical Association and their wives, Thursday, November 15th, at 12:30 P. M. at the White House. Of special interest to the ladies will be the reception at the Washington Club on Tuesday afternoon, where Mrs. Woodrow Wilson will be the guest of honor. The usual reception to the President of the Southern Medical Association will be held on Tuesday night at the New National Museum, one of the most beautiful public buildings of Washington, a detachment of the Marine Band furnishing the music. Other special entertainments are being arranged.

Physicians who play golf are urged to bring their clubs. There will be a golf tournament at which the usual prizes will be offered. Play will be over the championship course of the Columbia Country Club.

Reduced rates have been granted by railroads on the certificate plan. Each member of the Southern Medical Association will receive a certificate without application for it. Any physician who is a member of his state and county medical society, although not a member of the Southern Medical Association, who desires to attend this meeting, can have the benefit of these reduced rates by requesting a certificate from the Association office, Birmingham, Ala.

University of Virginia News.

The one hundredth continuous academic session of the University of Virginia was formally opened September 27th, with a record attendance in all departments. In the department of medicine there was an increase of twenty-three over last year in the registrations on the evening prior to the formal opening: six of the fifty-four women who had registered to that time were in the department of medicine.

Among the gifts to the University, announced by President Alderman, were a portrait of Dr. Richard Henry Whitehead, former dean of the department of medicine, which was given by members of the medical faculty and students; $10,000 from an anonymous donor for the establishment of the Richard Henry Whitehead scholarship in medicine; and $1,000 from Dr. Seale Harris, of Birmingham, Ala., for the establishment of a sholarship in memory of his father, Dr. Charles Hooks Harris.

An unusual distinction has come to the second year medical class in that two of its members, Benjamin May Baker, Jr., Machipongo, Va., and Eldridge H. Campbell, Jr.,

Carbon, W. Va., have won the Rhodes scholarship. They left the 29th of September for England where they are to study at Oxford University as Rhodes scholars.

Medical College of Virginia.

At the opening of this school the middle of September, 530 students were matriculated in the three departments of medicine, dentistry and pharmacy—the largest enrollment since 1914—and more than 100 applicants for the study of medicine were rejected because of lack of space in the lecture rooms. It is apparent that something should be done to take care of students from this section who do not wish to go to schools further from home.

Dr. R. D. Thornton, for ten years a member of the teaching staff of the Royal College of Dental Surgeons of the University of Toronto, and known throughout Canada as an authority on dentistry, has been added to the dental faculty of the school. He will have the position of superintendent of the dental infirmary and professor of operative technic.

Dr. Thomas D. Jones

Has returned to his home in Richmond, after spending a year in postgraduate work at several New York hospitals and serving during the summer months as senior house physician on the Boston Floating Hospital for Children. He will move his offices to the Medical Arts Building, this city, upon its completion.

Secretary, N. Y. State Department of Health.

Dr. Matthias Nicoll, Jr., State Commissioner of Health of New York, has appointed Dr. Edward H. Marsh, of Brooklyn, as secretary of the New York State Department of Health, to succeed Curtis E. Lakeman who has resigned to take up a different work in New York City.

Civil Service Examinations.

The U. S. Civil Service Commission announces open competitive examination for the following examinations, applications to be rated as received until December 28, 1923:

Junior medical officer, to fill vacancies in the positions of physician in the Indian Service, surgeon in the Coast and Geodetic Survey, and physician in the Panama Canal Service for duty outside of hospitals;

Graduate nurse, and graduate nurse (follow-up), for filling vacancies in the U. S. Veterans' Bureau and in the Indian and Public Health Services.

Both examinations are open to all citizens of the United States who meet the requirements. These may be obtained from the above named Commission at Washington, D. C.

Dr. Joseph L. Spruill

Recently resigned as state clinician of the tuberculosis sanatorium, at Sanatorium, N. C., to accept the position as superintendent of the Guilford County Tuberculosis Hospital, at Jamestown, N. C.

Dr. B. B. Bagby,

Formerly of West Point, Va., but now in charge of the Henrico County Health Unit in its malaria control work, has moved his home to Richmond and is at 1402 Avondale Avenue.

Dr. R. E. Mitchell,

After spending two years in post-graduate work at the Brooklyn, N. Y., Eye and Ear Hospital, has returned to his home in Richmond and will limit his work to diseases of the eye, ear, nose and throat. He will have offices in the Medical Arts Building, which is to be completed shortly.

Dr. H. B. Mulholland

Has returned to the University of Virginia as instructor in Internal Medicine, after a service at Peter Brent Brigham Hospital, Boston, Mass.

Dr. Tom A. Williams,

Washington, D. C., by invitation, addressed the Delaware State Medical Association at their annual meeting at Middletown, October 10, his subject being Fundamentals in Psychotherapy.

Dr. Williams recently published a book entitled "Dreads and Besetting Fears, Including States of Anxiety."

Dates Selected for A. M. A. Meeting.

The Board of Trustees of the American Medical Association has selected May 19-23, 1924, as the dates for the Chicago meeting of the Association.

The American Roentgen Ray Society,

At its annual meeting in Chicago, last month, elected Dr. Hollis E. Potter, Chicago, as president, and Dr. George Winslor Holmes, Boston, as president elect. Dr. William Duane, of Harvard University, Boston, was the recipient of the $1,000 Leonard prize, for the best original research in the field of roentgen ray, radium, or radio-activity.

Dr. W. S. Rankin,

Raleigh, N. C., State health officer of North Carolina, has applied for a year's leave of

absence, that he may work with the State Health Department of New York, upon their request.

Dr. and Mrs. O. J. Henderson

And son, of Montgomery, W. Va., recently visited friends in Northumberland County, Virginia. Dr. Montgomery is an alumnus of the Medical College of Virginia and has many friends in this section.

Child Health Station in Newport News.

The Newport News, Va., Child Health Station has opened offices in the building occupied by the American Red Cross. Dr. C. B. Ransome, health officer of Newport News, is chairman of the committee in charge of this work.

Dr. and Mrs. O. L. Watkins,

Rustburg, Va., were recent visitors in Richmond.

Dr. E. W. Perkins

Announces his removal from Reams, Va., to 109 Franklin Street, Petersburg Va.

Dr. E. S. Barr,

Recently medical director of the Philadelphia Hospital for Mental Diseases, at Byberry, Philadelphia, is now connected with Highland Hospital, Asheville, N. C. Dr. Barr graduated from Medical College of Virginia in 1916 and is a member of the Medical Society of Virginia.

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons,

At its annual meeting held in Philadelphia, in September, elected Dr. James F. Baldwin, Columbus, O., president, and Dr. James E. Davis, Detroit, secretary.

Interchange of Health Officers in the United States.

An event which may be fraught with far reaching consequences for world health is the Third General Interchange of Health Officers arranged by the Health Section of the League of Nations which is now taking place in the United States.

Representatives from France, England, Italy, Russia, Poland, Spain, Holland, Belgium, Greece, Jugoslavia, Germany, Switzerland, Norway, Mexico, San Salvador, Brazil, Chile, and Canada, delegated by their respective governments to participate in a course of study and observation, arrived in America the first week in September and will remain for approximately three months. This group numbers among its members many of the most eminent sanitarians of the world. Until September 22 the delegates remained in Washington, studying national health organization as administered by the U. S. Public Health Service.

Following the close of the course of study of the national health agency, the delegation of visitors separated into three groups, one of which came to Virginia, another to North Carolina and a third to Alabama, where about three weeks will be spent in studying state and local health departments. Richmond, Va., Raleigh, N. C., and Montgomery, Ala., are the Southern cities which were selected for study. From these places the groups will proceed to Massachusetts, New York and Pennsylvania, respectively, for the purpose of studying the health administration in three Northern States and small cities. Syracuse, N. Y., Allentown, Pa., and one of the smallest cities of Massachusetts, yet to be designated, will be visited for a short period. Following this the groups will make a study of health administration in Boston, New York and Philadelphia. Present plans call for a reassembling of the entire delegation in Washington late in November for a final conference.

To Aid Hospital Reconstruction Work in Japan.

Dr. Rudolf Teusler, formerly of Richmond in which place he was visiting at the time of the earthquake in Japan, has returned to Tokyo to aid in the reconstruction work of St. Luke's Mission Hospital in that city, of which he is director in charge. In a communication received by Dr. Teusler before leaving this country, it was stated that all of the American physicians at the Hospital were safe, but no report was made as to the twenty-two Japanese physicians and the eighty nurses at the institution.

St. Luke's Hospital was established in Tokyo twenty-three years ago and was filled with patients at the time of the catastrophe. It is feared that many were killed by the earthquake and in the fire which followed. The foundation of the new St. Luke's Hospital, which had been completed as far as the first floor, was also destroyed.

Dr. Wm. N. Botts,

Appalachia, Virginia, who for the past two years has limited his practice to diseases of the eye, ear, nose and throat, has gone to New York where he will take work in that specialty from October 1st to January 1st, 1924.

Upon his return from New York, Dr. Botts will open at Appalachia, a hospital devoted exclusively to the medical and surgical treatment of eye, ear, nose and throat diseases.

Jewish Maternity Hospital to Have New Building.

The Jewish Maternity Hospital, of New York City, has purchased lots at the northeast corner of Fifth Avenue and 108th Street, New York City, on which it will build a 12-story hospital building with 150 beds. The estimated cost is to be $1,000,000.

On Democratic Committee.

Drs. Roderick Dew, Woodford, and A. L. Martin, Naulakla, have been elected members of the new democratic committee of Caroline County, Virginia.

Parke, Davis and Company,

Detroit, Mich., announce the appointment of Dr. Earl Miller as Director of the Department of Experimental Medicine, to fill the vacancy following the death of Dr. Ezra Read Larned, who was the originator and organizer of this department and occupied the position as head of the department until his death. Dr. Miller was assistant to Dr. Larned for twelve years and has a wide acquaintance among medical men interested in clinical research work.

Dr. L. E. Fuller,

Recently of Axton, Va., is now located at Witt, Va., where he will continue in general practice.

Dr. R. R. Goad

Advises us of his change of address from Dublin, Va., to Hillsville, Va.

Dr. Leland E. Cofer,

Formerly of Richmond and an alumnus of the Medical College of Virginia, has been appointed director of the division of industrial hygiene of the New York State Department of Labor. Dr. Cofer has been a member of the U. S. Public Health Service for about thirty years and served two terms as an assistant surgeon general in the Service.

Married.

Dr. Russell LaFayette Cecil and Miss Eileen Cumming, both of New York City, September 26. Dr. Cecil was formerly of Richmond, Va.

Dr. Patton K. Pierce, Tuscaloosa, Ala., and Miss Helen Hammer, of University (Va.) Hospital Training School, July 25. Dr. Pierce made his home for a while after graduation at University, Va.

New Surgeon With Woman's Medical College, Philadelphia.

Dr. W. J. Bransfield, a well known surgeon of Philadelphia with a most excellent war record, has been appointed clinical professor of surgery at the Woman's Medical College of Pennsylvania, in Philadelphia.

Medical Section, League of Nations.

Announcement has been made that the medical section of the League of Nations will hold a two weeks' meeting in Philadelphia, beginning November 11. Arrangements for the visit of the delegates is being made by Dr. J. Blair Spencer, director of the Department of Public Health of that city. The program will be of a technical nature and public health problems in all their phases will be studied.

Cancer Campaign.

It was decided that instead of holding a single National Cancer Week this year, a series of six cancer campaigns will be held, one month being devoted to the subject in each of six regions in the United States and Canada. The Virginia campaign will be in force from October 15 through November 14. Our State Society meeting coming at the beginning of this period, it has been decided to have the chairman of the Virginia division, Dr. Robert C. Bryan, Richmond, give a talk on "The Cancer Problem" on opening night of the meeting in Roanoke. The campaign work calls for devoting three weeks in each region to making ready for the campaign and devoting the fourth to carrying out the activities.

In connection with this campaign work, it may be interesting to note that during 1922 there were in Virginia 1,364 deaths from this one disease. The ratio of cancer deaths among the white population is about three and a half times that among the colored population, and the disease is more prevalent among females than among males. From these figures, the need of education in prevention of cancer is apparent.

Dr. Paul C. Colonna

Announces the removal of his office to 42 Park Avenue, New York City. His work will be limited to orthopaedic surgery. Dr. Colonna is a graduate of the Johns Hopkins University Medical School in the class of '20.

Dr. Frederick E. Hamlin,

Staunton, Va., left the first of October to take a two years' course in eye, ear, nose and throat work at the University of Pennsyl-

vania. Upon the completion of this course, he will give up general practice and specialize along these lines.

Dr. Hamlin had made his home in Staunton since 1915 and had many friends in that section. On the evening of September 25, a number of his professional colleagues tendered him a complimentary banquet at Beverley Hotel, as an expression of their high esteem and to wish him Godspeed in his new career.

Miss Rose Z. Van Vort,

Aften ten years' work at Stuart Circle Hospital as superintendent and principal of the School of Nurses, has resigned to take up organization work. Her resignation will be effective December 15.

The American Medical Editors' Association

Will hold its fifty-fourth annual meeting at Auditorium Hotel, Chicago, Ill., October 25 and 26. Dr. Henry O. Marcy, of Boston, is president of the Association, and Dr. F. H. McMechan, Avon Lake, O., secretary.

Notice to Wives and Daughters of Doctors.

As the Constitution and By-Laws of the Woman's Auxiliary to the Medical Society of Virginia will be formally adopted at the meeting of the Medical Society of Virginia, October 16-19, inclusive, all members of the Auxiliary are urged to attend. Even though delegates have been appointed, every one will be entitled to vote, and a large attendance is desired.

The Bedford County Medical Society,

At a recent meeting, elected the following officers: President, Dr. W. O. McCabe, Thaxton; vice-president, Dr. R. A. Bennett, Huddleston; secretary-treasurer, Dr. J. A. Rucker, Bedford. Drs. W. O. McCabe and J. A. Rucker were elected delegate and alternate, respectively, to the Roanoke meeting.

Location to Exchange.

Wish to exchange Richmond property—new brick buildings in most rapidly developing part of the city (rented for $2,268 a year) for a doctor's home and small farm in the country. Prefer small neat house in good roads' community, near railroad. Address "Exchange" care this journal. (Adv.)

Wanted Physician.

Richmond doctor wishes physician to take charge of his practice for the month of November or December. Address reply with references to No. 275, care this journal. (Adv.)

Obituary

Dr. William L. Hudson,

One of the most beloved and prominent physicians of Northern Virginia, died suddenly September 17, while making a professional call. He was stricken with apoplexy shortly after reaching the home of a patient, and expired before a doctor could reach him. Doctor Hudson was born in Luray, Va., 74 years ago and, after completing his academic education at local schools, studied medicine at the Louisville Medical College, from which he graduated in 1874. Dr. Hudson had practiced in Page County for the past forty years and was for a number of years a member of the Page County Board of Health and was also coroner of Page County. He was also for sometime a local surgeon for the Norfolk and Western Railway Company. He joined the Medical Society of Virginia in 1904. Dr. Hudson is survived by his wife and four daughters.

Dr. John Alexander Williams,

A well known surgeon of Greensboro, N. C., committed suicide September 23, in a private sanitarium near Baltimore, by severing an artery in his right leg and bleeding to death. Dr. Williams was fifty-two years of age and graduated from the University of Virginia Medical School in 1895.

Dr. James Widgery Marshall,

Of Leesburg, Va., died at Johns Hopkins Hospital, Baltimore, September 29, following an operation for the removal of a blood clot. He was born in Iowa, fifty-one years ago and studied medicine at George Washington University Medical School, Washington, D. C., from which he graduated in 1901. Dr. Marshall moved from Washington to Loudoun County, Virginia, about ten years ago, on account of his health. Last spring, he went to Vienna, Austria, to take up post-graduate work, which he finished and was on his way home when he was parlyzed. He was brought to the Loudoun Hospital and later taken to Johns Hopkins Hospital. His wife, a brother and two sisters survive him.